Treatment of Posttraumatic Stress Disorder in Postwar Kosovar Adolescents Using Mind-Body Skills Groups: A Randomized Controlled Trial

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Objective: To determine whether participation in a mind-body skills group program based on psychological self-care, mind-body techniques, and self-expression decreases symptoms of posttraumatic stress disorder (PTSD).

Method: Eighty-two adolescents meeting criteria for PTSD according to the Harvard Trauma Questionnaire (which corresponds with 16 of the 17 diagnostic criteria for PTSD in DSM-IV) were randomly assigned to a 12-session mind-body group program or a wait-list control group. The program was conducted by high school teachers in consultation with psychiatrists and psychologists and included meditation, guided imagery, and breathing techniques; self-expression through words, drawings, and movement; autogenic training and biofeedback; and genograms. Changes in PTSD symptoms were measured using the Harvard Trauma Questionnaire. The study was conducted from September 2004 to May 2005 by The Center for Mind-Body Medicine at a high school in the Suhareka region of Kosovo.

Results: Students in the immediate intervention group had significantly lower PTSD symptom scores following the intervention than those in the wait-list control group ($F = 29.8$, $df = 1,76$; $p < .001$). Preintervention and postintervention scores (mean [SD]) for the intervention group were 2.5 (0.3) and 2.0 (0.3), respectively, and for the control group, 2.5 (0.3) and 2.4 (0.4), respectively. The decreased PTSD symptom scores were maintained in the initial intervention group at 3-month follow-up. After the wait-list control group received the intervention, there was a significant decrease ($p < .001$) in PTSD symptom scores compared to the preintervention scores.

Conclusions: Mind-body skills groups can reduce PTSD symptoms in war-traumatized high school students and can be effectively led by trained and supervised schoolteachers.

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The conflict between the Serbian military and the Albanian resistance forces in the province of Kosovo began in early 1998. Fighting quickly spread to the Suhareka region, a fertile agricultural area in the southern part of Kosovo. Fighting, the burning of houses, the forced expulsion of residents, murders, beatings, rapes, and systematic massacres of groups of Albanian civilians continued through June 1999, when NATO troops entered Kosovo.

Suhareka was particularly hard hit by the war. One of the largest single massacres in Kosovo occurred here. Ninety percent of all homes in the area were destroyed or damaged beyond repair. Twenty percent of students in Suhareka's Jeta e Re ("New Life") High School lost 1 or both parents. Teachers and students were killed, and their portraits hang in the central hall of the school.

Posttraumatic stress disorder (PTSD) has been widely reported in children and adolescents exposed to war in the Balkans. One survey conducted during the war in Bosnia revealed that 94% of 308 Bosnian children met the criteria for PTSD.[1] Because this study was done during the war, the trauma was still ongoing, which may explain the extremely high levels of PTSD. However, the study was conducted 2 years into the war, and the authors state that PTSD rather than acute stress disorder was measured. Similar results were seen in displaced adolescents from

the war in Croatia—all 45 subjects had levels of PTSD symptoms ranging from weak to intense.[2]

Although the level of symptomatology may decline after the conflict ends, PTSD in children and adolescents in Kosovo remains a significant postwar problem. One study, in June 2000, 1 year after the war, found that 25% of Kosovar Albanians aged 15 years or older reported PTSD symptoms.[3] The second study, a year later, measured an overall prevalence of 23.5% for PTSD.[4] An unpublished survey of 226 high school students in 2005, 6 years postwar, in the Suhareka region, using the trauma symptom list of the Harvard Trauma Questionnaire (HTQ), revealed a prevalence of PTSD of 45.1% (J.S.G, unpublished data, 2006).

Psychological interventions for PTSD with children and adolescents have included cognitive-behavioral therapy (CBT), psychotherapy, and eye movement desensitization and reprocessing.[5] CBT is the most widely studied and has been effective in reducing PTSD symptoms in school-based programs with war-related trauma in refugee children,[6] in children exposed to community violence,[7] in children and adolescents experiencing single-incident traumatic events,[8] and in children following an earthquake.[9] A school-based trauma/grief–focused group psychotherapy postwar program also reduced PTSD scores, as measured by the Reaction Index-Revised, in Bosnian adolescents.[10]

Some mind-body techniques have been used in PTSD interventions in previous studies, including deep breathing,[10–12] progressive muscle relaxation,[11,12] and positive imagery.[12] Cultural art therapy programs (including arts and crafts, music therapy, and dramatic play) have been used to treat war-traumatized children in Croatia and Bosnia.[13] Art therapy has also been used with children exposed to the trauma of an earthquake[14–16] and to a school bus accident.[17] One small program combined several mind-body techniques in individual, family, and group sessions to decrease PTSD symptoms in 10 adolescent Kosovar refugees.[18]

The Center for Mind-Body Medicine (CMBM) approach in the current study is more comprehensive. It combines a number of mind-body modalities and a variety of forms of self-expression and is offered in a replicable, small-group format in a school setting. It is also the first randomized controlled trial (RCT) of any intervention with war-traumatized adolescents. A 2004 review article listed only 8 RCTs altogether of children and adolescents with PTSD or traumatic symptomatology from any cause.[19] Since then, a few additional RCTs have been published on interventions for PTSD as a result of a single traumatic event,[8] sexual abuse,[20,21] cancer,[22] a road traffic accident,[23] or a combination of a single traumatic event and sexual abuse.[24] A quasi-RCT has also been published reporting on a school-based program that includes some mind-body skills for preventing and treating terror-related distress.[25]

This study was implemented after a previous pilot study in the same high school showed significant reduction in symptoms of PTSD.[26] The aim was to see if these results could be replicated in a more rigorous RCT.

METHOD

Participants

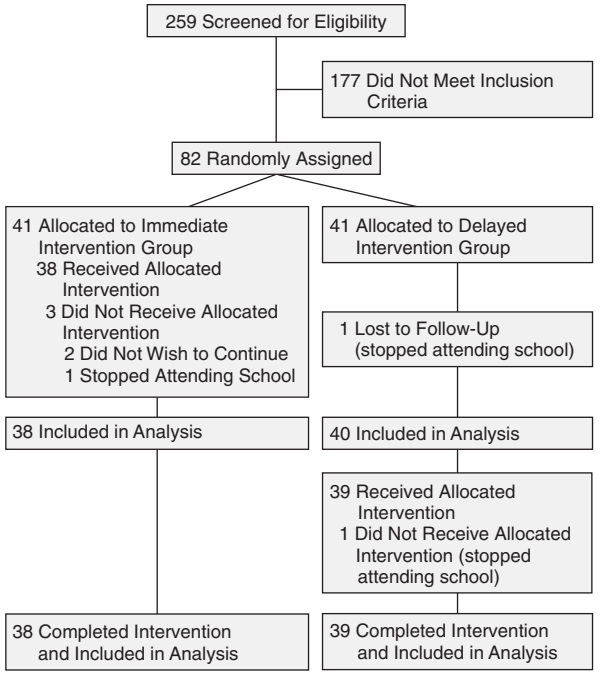
The study was conducted at Jeta e Re ("New Life") High School in Suhareka from September 2004 to May 2005. Written informed consent was obtained from the parents of students with assents from the students. The study protocol was approved by the Gallaudet University Institutional Review Board and the Theranda (Suhareka) Education Department/Ministry of Education of Kosovo.

In order to determine eligibility for participation in the study, 259 students (154 female and 105 male) were interviewed by the teachers and screened using the 16 trauma symptom questions of the HTQ. These questions correspond with 16 of the 17 diagnostic criteria for PTSD as set forth in the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (DSM-IV),[27] and are assessed using a 1- to 4-item Likert-type scale. The HTQ has been shown to have good internal reliability.[28] In 2 surveys of Kosovar Albanians aged 15 years and older, the Cronbach α coefficient was .81 and .76, respectively.[3] In this study, $\alpha = .84$ for the initial screening. The HTQ has also been used in an intervention study with adolescents in Kosovo[18] and as a survey tool with adolescents in Bosnia.[29]

PTSD was defined according to a scoring algorithm previously described by the Harvard Refugee Trauma Group[30] and used in a Kosovar Albanian population.[31] This definition of PTSD requires a score of 3 or 4 on at least 1 of the 4 reexperiencing symptoms (criterion B), at least 3 of the 7 avoidance/numbing symptoms (criterion C), and at least 2 of the 5 arousal symptoms (criterion D). Exposure to a traumatic event that involved actual or threatened death or serious injury (criterion A1) and that involved a response of fear, helplessness, or horror (criterion A2) was deemed to have been met by all students in this region where 90% of the homes were destroyed by artillery or burning during the war and the vast majority of the population was forced at gunpoint to leave Kosovo. The Albanian version of the questionnaire was obtained from its previous use in Kosovo,[31] and its accuracy was verified by back translation.

Eighty-two students met the PTSD criteria. Significantly more female students met the criteria than male students (40% of screened females and 19% of screened males) ($\chi^2 = 13.0$, df = 1, $p < .001$). All eligible students agreed to participate in the study, presumably because the level of distress was high and the program had been ongoing at the school, where students had heard positive feedback about the program from their friends. Students were

Figure 1. Flowchart of Participation in the Study



stratified according to gender and randomly assigned by the research director using random numbers generated by Microsoft Excel 2003 (Microsoft Corporation, Redmond, Wash.). The list of assigned groups was given to the teachers, who then notified the students of their group assignment. There were 62 female students and 20 male students aged 14 to 18 years (mean age, 16.3 years) (Figure 1).

Intervention

The mind-body skills group program was taught by 4 of the school's teachers who had been trained by Washington, D.C.–based faculty of the CMBM in a 2-part, 10-day intensive training in Pristina, Kosovo in 1999–2000. The teachers were supervised by CMBM's Kosovo faculty of psychiatrists and psychologists. This model, with minor modifications, has been used since 1994 by the CMBM in training clinicians in the United States.[32] It has been employed by CMBM faculty and graduates in the United States and abroad in the training program with children and adults with chronic illness,[33] with medical students,[34,35] and with children, adults, and adolescents traumatized by war and terrorism in the Balkans.[26]

This model combines a number of mind-body modalities together with self-expression (through the spoken and written word and in drawings and movement) in a supportive, small-group school setting. The format, which has now been incorporated in a manual,[36] is designed to provide a supportive, nonjudgmental, empathic environment in which self-expression, sharing, and listening are encouraged but discussions of specific traumas are not required; to teach adolescents self-care techniques that decrease stress, improve mood, and enhance cognitive and imaginative functioning; to give them skills they can use in daily life to deal with traumatic events; and to help them to understand that the trauma they suffered and the concerns they have are shared and understood by their peers as well as their group leaders.

The mind-body skills group program for students was held for 2 hours twice per week for 6 weeks (12 sessions total). The program consisted of small group sessions with about 10 students per group. After the first introductory session, each group began with a meditation (slow, deep belly breathing). This meditation was followed by a check-in in which each student shared experiences of the previous days, how he or she had been using techniques previously learned, and how he or she was feeling "right now." The group continued with the leader explaining an expressive or mind-body technique and an experience of this technique.

Mind-body techniques taught included guided imagery, relaxation techniques, several forms of meditation, autogenic training, and biofeedback. Drawings, written exercises, and active techniques (fast, deep breathing; shaking; and dancing) were used to help students relieve tension and express feelings and thoughts. Genograms encouraged students to explore strengths, vulnerabilities, and sources of emotional support in their own families. After the experiential exercise, students were invited to share what they had just experienced, including any emotions or memories evoked. They were also asked to report on the technique's success in helping them to reduce their level of stress or to explore and address a troubling situation, feeling, or symptom. Each group concluded with a second period of slow, deep breathing. An outline of the 12 sessions is provided in Table 1.

Measures

The HTQ used in determining PTSD criteria for eligibility was also used as the PTSD measure. The total score was the sum of all 16 item scores on a 1- to 4-item Likert scale, divided by the total number of items. The screening score was used as the baseline measure for the first intervention group and the wait-list control group (first assessment). After the first intervention group finished the 12 sessions, another 12-session mind-body skills program was held for the wait-list control group. Students in both groups were reinterviewed using the HTQ at the following time points: (1) upon the completion of the 12-session program by the first intervention group (second assessment) and (2) upon completion of the 12-session program by the wait-list control group (third assessment) (Table 2). Follow-up was not done on the control group due to lack of time remaining in the school year.

Table 1. Mind-Body Skills Group: The Twelve-Session Format[a]

Session I	Check-in Who are you? Why did you join this group? What would you like to get out of it? Discussion of group structure and ground rules: speaking in turn, confidentiality, no interruption or analyzing, staying in the present (speaking about what is happening now), and "I pass"—no pressure to speak Explanations of connection between mind and body Discussion of techniques that will be taught First practice of slow, deep, relaxed breathing exercise ("Soft Belly" meditation)
Session II	Three drawings a. Yourself—how you feel now b. Yourself—with your main problem c. Yourself—how you would like to be
Session III	Guided body scan to promote awareness of physical sensations and relaxation
Session IV	Use of "Safe Place" imagery
Session V	Discussion of biofeedback and autogenic training Use of autogenic phrases with measurement of change in physical symptoms by temperature-sensitive biodots
Session VI	Inner guide imagery to mobilize imagination and intuition to solve problems
Session VII	Fast-deep breathing followed by free movement to music
Session VIII	Forgiveness meditation: a Buddhist practice for forgiving others and oneself
Session IX	Use of genograms to explore one's place in one's family, family strengths, and family weaknesses Sharing of genograms
Session X	Continuation of sharing genograms
Session XI	Repeat of three pictures used in session II d. Yourself—how you feel now e. Yourself—with your main problem f. Yourself—how you would like to be Sharing of differences and similarities between the two sets of drawings
Session XII	Concluding group Discussion of what has been learned and how students have used and will use techniques themselves and with others (family, friends, etc)

[a]Reprinted with permission from Gordon.[36]

The presence of reexperiencing, avoidance/numbing, or arousal symptoms was measured using the HTQ and the algorithm described previously based on DSM-IV criteria.[30] These symptom clusters were analyzed using a dichotomous yes-no scale. The following scores determined whether symptoms were present: a score of 3 or 4 on at least 1 of the 4 reexperiencing symptoms, at least 3 of the 7 avoidance/numbing symptoms, and at least 2 of the 5 arousal symptoms.

Data Analysis

All analyses were performed using SPSS software, version 14 (SPSS Inc., Chicago, Ill.). A mixed-model repeated-measures analysis of variance (ANOVA) was used to measure changes in PTSD scores over time between the intervention group and the wait-list control group (group × time). A 1-way repeated-measures ANOVA with pairwise comparisons using the Bonferroni method was used to measure changes within each group over time. Differences in PTSD symptom clusters were measured using the χ^2 test for 2 independent samples. The Cochran Q test was performed to analyze changes in PTSD symptom clusters over time. The McNemar test (2-tailed) with Bonferroni correction (adjusted $\alpha = .05/3 = .017$) was used as a post hoc analysis to determine differences between the assessment points.

RESULTS

PTSD Scores

The intervention group had significantly decreased PTSD scores following the program (second assessment) compared to the control group ($F = 29.8$, $df = 1,76$; $p < .001$) (Table 3). Partial η^2 equaled 0.282, representing a large effect size.[37]

PTSD scores remained decreased at the 3-month follow-up of the first intervention group. The PTSD score at 3-month follow-up was not significantly different from the PTSD score immediately following the program ($p = .27$), and it remained significantly lower than the baseline score ($p < .001$). The mean change in the PTSD score from second assessment to third assessment was 0.12 (95% CI = –0.05 to 0.28) and from baseline to third assessment was –0.40 (95% CI = –0.57 to –0.23). The control group also had significantly reduced PTSD symptom levels after participating in the program ($p < .001$). The mean change in PTSD score before and after participation in the program was –0.38 (95% CI = –0.53 to –0.23).

PTSD Symptom Clusters

Following the initial program (second assessment), PTSD cluster symptoms of both reexperiencing and avoidance/numbing were significantly improved in the intervention group compared to the control group: reexperiencing ($\chi^2 = 10.6$, $df = 1$, $p = .001$) and avoidance/numbing ($\chi^2 = 16.8$, $df = 78$, $p < .001$) (Table 4). Phi coefficients for the reexperiencing and avoidance/numbing analyses were 0.369 and 0.464, respectively, indicating a medium effect size.[38] There was no significant improvement in arousal symptoms ($\chi^2 = 1.4$, $df = 1$, $p = .24$).

Significant changes were measured across time for all 3 PTSD symptom clusters in the first intervention group: reexperiencing ($p < .001$); avoidance/numbing ($p < .001$); and arousal ($p < .001$). There was a significant decrease in

Table 2. Timeline of Assessments

Group	Assessment 1	Assessment 2	Assessment 3
Immediate intervention	Before participation in mind-body skills groups	After participation in mind-body skills groups	Follow-up
Delayed intervention	Before waiting time	After waiting time and before participation in mind-body skills groups	After participation in mind-body skills groups

Table 3. PTSD Scores for Immediate Intervention and Delayed Intervention Groups

	Immediate Intervention		Delayed Intervention		Initial Assessment vs Second Assessment			Second Assessment vs Third Assessment			Immediate Intervention Group Changes Over Time, p Value
Assessment	N	Mean (SD)	N	Mean (SD)	F Statistic	df	p Value	F Statistic	df	p Value	
Initial (baseline) assessment	38	2.5 (0.3)	40	2.5 (0.3)	29.8	1,76	< .001				< .001[a]
Second assessment[b]	38	2.0 (0.3)	40	2.4 (0.4)				26.4	1,75	< .001	.27[c]
Third assessment[b]	38	2.1 (0.3)	39	2.1 (0.3)							< .001[d]

[a]Change over time from the initial assessment to the second assessment.
[b]The second assessment was immediately following the mind-body skills program for the immediate intervention group and at the completion of the waiting period for the delayed intervention group. The third assessment was 3 months following the completion of the mind-body skills program for the immediate intervention group and immediately following the program for the delayed intervention group.
[c]Change over time from the second assessment to the third assessment.
[d]Change over time from the initial assessment to the third assessment.
Abbreviation: PTSD = posttraumatic stress disorder.

Table 4. PTSD Cluster Symptoms for Immediate Intervention and Delayed Intervention Groups

	Students With PTSD Symptom Clusters Based on DSM-IV Criteria				Initial Assessment vs Second Assessment		Immediate Intervention Group Changes Over Time, p Value[a]
	Immediate Intervention		Delayed Intervention				
Cluster Symptom	N	N (%)	N	N (%)	χ^2	p Value	
Reexperiencing							
Initial (baseline) assessment	38	38 (100)	40	40 (100)	10.6	.001	< .001[b]
Second assessment[c]	38	18 (47)	40	33 (83)			.15[d]
Third assessment[c]	38	24 (63)	39	23 (59)			< .001[e]
Avoidance and numbing							
Initial (baseline) assessment	38	38 (100)	40	40 (100)	16.8	< .001	< .001[b]
Second assessment	38	9 (24)	40	28 (70)			.031[d]
Third assessment	38	19 (50)	39	14 (36)			< .001[e]
Arousal							
Initial (baseline) assessment	38	38 (100)	40	40 (100)	1.4	.24	< .001[b]
Second assessment	38	26 (68)	40	32 (80)			.791[d]
Third assessment	38	28 (74)	39	31 (79)			.002[e]

[a]After Bonferroni adjustment, p values less than .017 (.05/3) are considered significant.
[b]Change over time from the initial assessment to the second assessment.
[c]The second assessment was immediately following the mind-body skills program for the immediate intervention group and at the completion of the waiting period for the delayed intervention group. The third assessment was 3 months following the completion of the mind-body skills program for the immediate intervention group and immediately following the program for the delayed intervention group.
[d]Change over time from the second assessment to the third assessment.
[e]Change over time from the initial assessment to the third assessment.
Abbreviation: PTSD = posttraumatic stress disorder.

all 3 symptom clusters immediately following participation in the program (second assessment) (Table 4). There was no significant change from the second assessment to the third assessment in any of the symptom clusters, indicating that the decrease was maintained at the 3-month follow-up.

A secondary intent-to-treat analysis was performed. Missing data were replaced with a last-observation-carried-forward imputation scheme. The results of the intent-to-treat analysis were similar to the results of the per-protocol analysis for both PTSD score data and symptom cluster data.

DISCUSSION

This RCT shows that the mind-body skills group program, led by intensively but briefly trained teachers, was effective in reducing levels of PTSD symptoms in war-traumatized high school students in the Suhareka region of Kosovo 5 years after the war ended. Mean scores of

PTSD were significantly reduced immediately following participation in the program by the intervention group in comparison to the control group. Reductions were maintained at 3-month follow-up. Following participation in the program, the control group also had significantly reduced PTSD scores.

When symptom clusters were examined separately, reexperiencing and avoidance/numbing symptoms were significantly decreased in the treatment group and remained decreased at 3-month follow-up. Although arousal symptoms also decreased and remained low in the treatment group, the reduction in symptoms was not statistically significant compared to the control group because there was also a decrease in arousal during the waiting time in the control group.

While we cannot be sure of the reasons for this improvement in the control group, we hypothesize that it may have been because the students knew they would soon be participating in a group from which they had high expectations. Hopeful anticipation, therefore, may have decreased their anxiety. The improvement in reexperiencing and avoidance/numbing symptoms, by contrast, would appear to require the actual practice of the techniques learned in the group as well as the feelings of sharing, support, and safety that only group membership could provide.

The CMBM program uses a variety of mind-body techniques. The goal of the study was to evaluate the model as a whole rather than to determine the effectiveness of the individual modalities. Because different techniques appeal to different students, teaching a variety of techniques has the advantage of allowing the students to devote more time to practicing those techniques that they find most effective on their own. All students had time in the initial check-in of each group meeting and after each experiential exercise to share memories of traumatic experiences that arose and/or were currently troubling them.

It is likely that several factors contributed to the effectiveness of the group program. These factors include the social support offered; the opportunity for self-expression, particularly about traumatic events; the stress-reducing effects of the mind-body techniques that were taught; the techniques' contribution to the students' sense of control over symptoms; and the students' use of imaginative techniques to solve problems.

The groups clearly provided an ongoing system of social support. The meetings were a time for students and teachers to be together in a less formal way than was ordinarily possible during school hours. Teachers participated in the small-group experiential activities that they led, sharing their experiences and practicing the techniques along with their students. Social support from teachers and classmates has been shown to be a predictor of PTSD symptomatology in children: lower levels of social support were related to more symptoms.[39]

The small groups offered the opportunity for students to share painful and traumatic wartime experiences; to express feelings about them in words, drawings, and movement; and to speak of current difficulties and symptoms. According to a number of interviews and observations (by J.S.G., A.B., and M.B.) during the 5 years of the group program, this process of sharing traumatic memories and vulnerable feelings was useful to all students and of extraordinary value to some. This conclusion and these observations are quite congruent with findings from studies on verbal "testimony psychotherapy"[40] and on the use of drawings with traumatized populations.[14–17] The approach in the small groups was different from exposure therapy, however, since the students were not required to discuss the traumatic events but were invited to share them if and when they felt comfortable doing so.

The mind-body skills themselves are very likely to have made a major contribution to decreasing the levels of stress and to diminution of PTSD symptoms. These skills, especially biofeedback, autogenic training, meditation, and relaxation, have been demonstrated to lower sympathetic arousal, decrease anxiety, and improve mood.[41–44] They also offered an opportunity for young people to gain some level of control over the intensity of PTSD arousal symptoms and to create a more physiologically and psychologically relaxed state from which they could view symptoms of reoccurrence with less fear and more equanimity.

The use of guided imagery most likely reinforced this sense of mastery by helping students to find an "imaginary safe place" in times of emotional or social stress. This feeling of mastery has been cited as an important therapeutic element in a previously published trial on the use of imagery with traumatized sexual-assault survivors.[45] Other guided-imagery exercises, together with drawings and written exercises, helped students to discover intuitive solutions to chronic problems related to trauma, as well as to present day anxiety.

The study's main limitation was the lack of inclusion of a trauma exposure scale in the actual interviews with participants. This was done deliberately, so as not to obligate the students to discuss the traumatic events they had experienced. Because the loss of lives was so widespread and visible, the violence so pervasive, and the destruction of homes all but universal, the exposure to a traumatic event was assumed for students who met the other PTSD criteria.

A second limitation was the possibility that bias was introduced because the teachers both administered the intervention and performed the postintervention interview assessments. Initially, Kosovar psychologists and psychiatrists trained by CMBM were asked to do the screening and the postintervention assessments as well as lead focus groups, which could add a qualitative component to the study. The students, who were mistrustful of outsiders

and feared the considerable stigma attached to mental illness in Kosovo, were reluctant to speak openly with these mental health professionals. The students were far more comfortable talking with the teachers and sharing their trauma and symptoms with them. While it is possible that students wanted to please the teachers by reporting a decrease in symptomatology after the groups, the teachers' experience, and that of other observers (J.S.G. and A.B.), was that greater familiarity with the teachers, on the contrary, facilitated more frank discussions and sharing of problems and symptoms after as well as before and during the intervention.

A third limitation was that, when administered by interview, the HTQ in this study was a self-report measure and did not give a clinical diagnosis of PTSD. Therefore, changes in PTSD scores as measured by the HTQ were measuring changes in symptoms only and not changes in the clinical diagnosis of PTSD.

In summary, this is the first randomized controlled study to demonstrate the success of a therapeutic model for war-traumatized adolescents with PTSD. It showed that participation in small mind-body skills groups that combined self-expression and personal sharing with instruction in and use of meditative and imaginative mind-body techniques could significantly reduce PTSD symptoms in war-traumatized high school students. Because this study relied on training nonspecialist teachers, and because this kind of training can be offered to large numbers of health care professionals, teachers, and other community leaders, this model may also represent a promising approach to addressing PTSD in entire populations that have been affected by wars, epidemics, and other disasters. Future research will determine the effectiveness of this model in these populations.

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Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Childhood and Adolescent Mental Health section. Please contact Karen D. Wagner, M.D., Ph.D., at kwagner@psychiatrist.com.

