

## Stress Management and Resiliency Training for public school teachers and staff: A novel intervention to enhance resilience and positively impact student interactions



Sherry S. Chesak, Tejinder K. Khalsa, Anjali Bhagra\*, Sarah M. Jenkins, Brent A. Bauer, Amit Sood<sup>1</sup>

Department of Nursing, Division of General Internal Medicine, Division of Biomedical Statistics and, Mayo Clinic, Rochester, MN, USA

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### ABSTRACT

**Background:** Burnout in teachers has been linked to decreased effectiveness as educators, and suboptimal interactions with students. The purpose of this pilot study was to assess the outcomes of a brief Stress Management and Resiliency Training (SMART) program for public school staff.

**Materials and methods:** This single-arm, prospective trial involved an investigation of the effects of a brief SMART program on participant stress, anxiety, resilience, gratitude, happiness, life satisfaction, and quality of life (QOL).

**Results:** Significant improvements were noted in participant anxiety ( $P < 0.001$ ), stress ( $P = 0.003$ ), gratitude ( $P = 0.001$ ), happiness ( $P < 0.001$ ), life satisfaction ( $P < 0.001$ ), and QOL ( $P < 0.001$ ). Most participants reported that the skills learned positively affected interactions with students (77.2%) and coworkers (72.2%).

**Conclusions:** The SMART program showed promising effectiveness for improving anxiety, stress, gratitude, happiness, life satisfaction and QOL. Given the prevalence and impact of teacher burnout, larger, controlled trials and broader dissemination of the intervention are warranted.

### 1. Introduction

Burnout is considered a chronic psychological syndrome prompted by occupational stress and is characterized by physical and mental exhaustion, cynicism, and feelings of poor personal accomplishment [1]. It was recently recognized by the World Health Organization as “a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed” [2]. A key negative outcome of burnout has been identified as job withdrawal which manifests as lower work productivity, diminished quality of work, absenteeism, and intent to leave the profession [1]. In addition, employees experiencing burnout can negatively influence coworkers by contributing to increased personal conflict and work disruption [1]. On an individual level, burnout is a risk factor for poor physical and mental well-being, and it may adversely affect health [3]. A conceptual framework that describes the causal factors and outcomes of burnout is the Job Demands-Resources (JD-R) model, which indicates that individuals experience burnout when they perceive that they have inadequate personal and occupational resources to meet their job demands [4].

Burnout is of particular concern in the teaching profession as it is associated with reduced quality of instruction and diminished ability to engage and teach effectively [5], both of which can lead to potential student harm. Teacher stress, which can lead to burnout, is associated with numerous characteristics of the profession, including separation from other adults, inadequate opportunities for reflection, student misbehavior, the profession's emotional needs, high workload, changes due to reform efforts, inadequate salary or resources, and expectations from the school administrators [6]. Similar to other professions, burnout amongst teachers has been found to lead to poor job satisfaction [7] and high rates of absenteeism [8]. Subsequently, job dissatisfaction leads to attrition within the profession, which is at concerning levels with 8% annual attrition rates amongst teachers, and 19%–30% of new teachers leaving the profession within their first five years of teaching [9].

Mindfulness-based training for adults can help reduce stress, regulate emotions, improve health, facilitate prosocial dispositions including empathy, perspective taking and compassion [10]. Thus, mindfulness-based training is an intervention that plausibly helps

*Abbreviations:* SMART, Stress Management and Resiliency Training

\* Corresponding author. Division of General Internal Medicine, Mayo Clinic, 200 First St SW, Rochester, MN, 55905, USA.

E-mail address: [bhagra.anjali@mayo.edu](mailto:bhagra.anjali@mayo.edu) (A. Bhagra).

<sup>1</sup> Dr. Sood's present affiliation: Global Center for Resiliency and Wellbeing, Rochester, Minnesota.

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teachers better meet the demands of their jobs and prevent burnout [5]. Preliminary evidence suggests that mindfulness-based training may have positive effects on teachers' exhaustion, personal accomplishment, depersonalization, sense of well-being, self-efficacy, ability to manage classroom behavior, and maintain supportive relationships with students [5,11].

The term mindfulness is rooted in Buddhist traditions and is considered to be a mental aptitude related to attention, awareness, retention, and discernment [12]. According to Brown and Ryan [13], awareness is defined as “the conscious registration of stimuli, including the five physical senses, the kinesthetic senses, and the activities of the mind”, and attention is considered to be engaged when a stimulus is sufficiently strong and is manifested as a taking notice of the object. Thus, mindfulness skills are those that enhance one's ability to maintain focused attention, and improve monitoring functions which bring awareness to a wandering mind, and without judgement, restores attention [12].

An intervention that incorporates mindfulness practices and has been rigorously tested and shown to reduce stress and improve resilience in adults is the Stress Management and Resiliency Training (SMART) program. The SMART program is designed to enhance mental well-being through awareness of the brain's default instincts, daily brief attention mindfulness practices, and cultivation of resilience principles such as gratitude, compassion, acceptance, higher meaning, and

forgiveness [14]. Several clinical trials have demonstrated the efficacy of SMART for various outcome measures including stress, anxiety, quality of life, resilience, mindfulness, happiness, and health behaviors [15–19]. In a randomized controlled trial (RCT) investigating the SMART program with breast cancer survivors, statistically significant improvements were noted for resilience, perceived stress, anxiety, and quality of life twelve weeks post the initial intervention in comparison to a wait-list control group [20]. In another RCT with physician participants, significant improvements were demonstrated for resilience, perceived stress, anxiety, and quality of life for those who participated in the SMART intervention, in comparison to a wait-list control group [21]. However, the intervention has not previously been tested to determine its effect on public school teachers and its potential impact on their interactions at work. Therefore, the present pilot study was designed to investigate well-being outcomes related to the SMART intervention among public school teachers and staff, and its potential impact on participants' interactions with students and coworkers.

## 2. Materials and Methods

### 2.1. Study design

This report describes a prospective, nonrandomized, single-arm pilot study. Fig. 1 depicts the flow of participants through the phases of

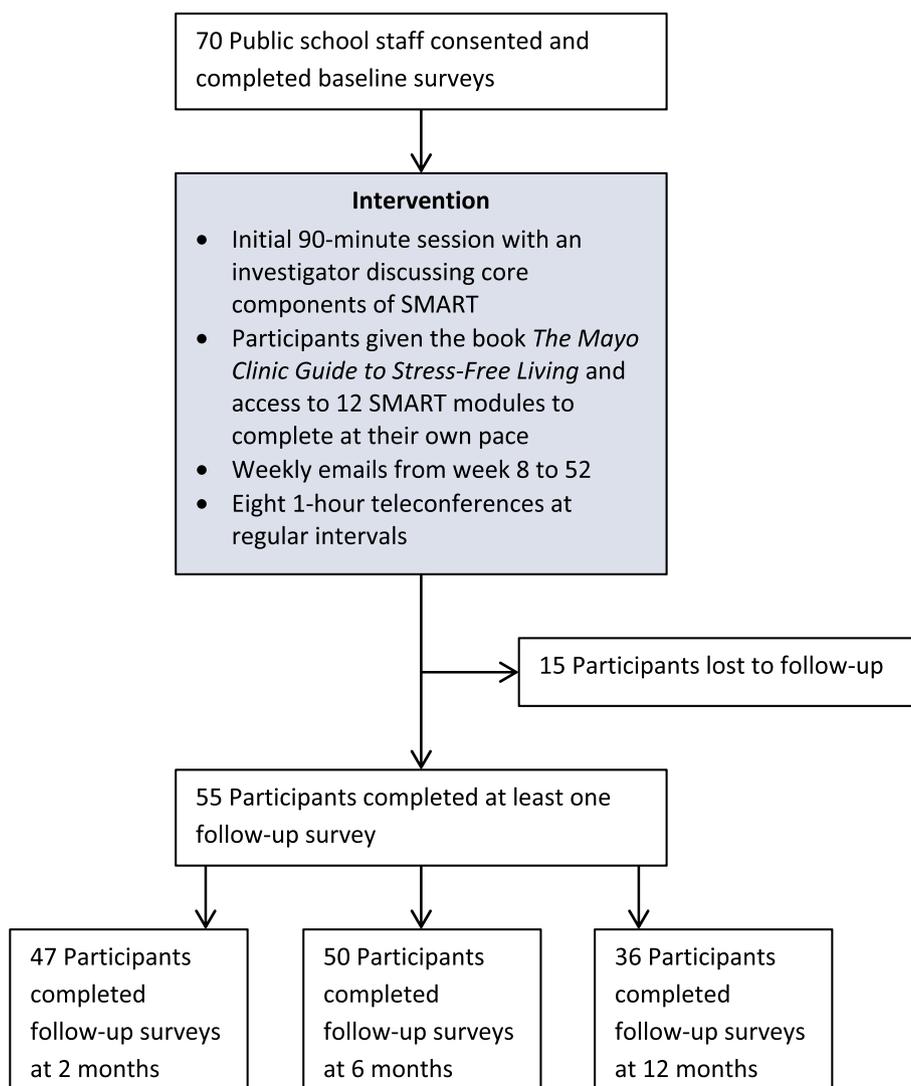


Fig. 1. Intervention and Flow of Participants Through the Study. SMART indicates Stress Management and Resiliency Training.

**Table 1**  
Study variables and outcome instruments.

| Study Variable                                          | Outcome Instrument                          | Source                      | Number of Items in Instrument | Administration Time Points       |
|---------------------------------------------------------|---------------------------------------------|-----------------------------|-------------------------------|----------------------------------|
| Resilience                                              | Connor-Davidson Resilience Scale (CD-RISC)  | Vaishnavi et al. [28]       | 2                             | Baseline and 2, 6, and 12 months |
| Anxiety                                                 | Generalized Anxiety Disorder 7-item (GAD-7) | Spitzer et al. [29]         | 7                             | Baseline and 2, 6, and 12 months |
| Quality of life                                         | Linear Analogue Scale Assessment (LASA)     | Coates et al. [30]          | 6                             | Baseline and 2, 6, and 12 months |
| Gratitude                                               | Gratitude Questionnaire                     | McCullough et al. [31]      | 6                             | Baseline and 2, 6, and 12 months |
| Happiness                                               | Subjective Happiness Scale                  | Lyubomirsky and Lepper [32] | 4                             | Baseline and 2, 6, and 12 months |
| Life satisfaction                                       | Satisfaction with Life Scale                | Pavot and Diener [33]       | 5                             | Baseline and 2, 6, and 12 months |
| Stress                                                  | Perceived Stress Scale (PSS)                | Leung et al. [34]           | 4                             | Baseline and 2, 6, and 12 months |
| Participant demographics                                | Demographic questionnaire                   | -                           | 9                             | Baseline                         |
| Impact on interaction with students, program evaluation | End-of-study questionnaire                  | -                           | 10                            | 12 months                        |

the trial and details the intervention. Quantitative data from self-reported measures were used to investigate the effects of the program. Participants completed survey instruments at baseline, 2 months, 6 months, and 12 months after the initial intervention. In addition, an end-of-study questionnaire was completed at 12 months.

**2.2. Sample and sampling method**

Participants included 55 public school teachers and other staff members. Inclusion criteria included: (1) a staff member who interacted with students in one of two public school districts in the Midwestern United States, (2) willing and able to complete all aspects of the study, and (3) able to read and speak English. Exclusion criteria included: (1) currently or recently (past 6 months) experienced a psychotic episode, or (2) had a clinically significant acute unstable neurological, psychiatric, hepatic, renal, cardiovascular or respiratory disease per participant self-report.

**2.3. Measurement instruments**

At baseline, before the start of the intervention, participants completed seven validated and standardized stress, resilience, and well-being instruments. A list of all instruments that were used in the study and the corresponding number of items for each instrument are shown in Table 1. The same instruments were completed at months 2, 6, and 12 of the study. The instruments were administered by a non-interventionist study team member in a paper and pencil format at the initial intervention, then with an online survey tool for the remaining measurements. Study data were collected and managed using REDCap electronic data capture tools hosted at Mayo Clinic [22]. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing (1) an intuitive interface for validated data entry; (2) audit trails for tracking data manipulation and export procedures; (3) automated export procedures for seamless data downloads to common statistical packages; and (4) procedures for importing data from external sources. An email invitation with a link to the survey was sent to participants at the appropriate time points. Two reminder emails were sent at three and six days following the initial invite for those who did not complete the questionnaires prior to those time points. After that time, the survey was closed. In addition, the participants completed an end-of-study questionnaire, which provided program evaluation information, including their perception of how the program affected their interactions with students and coworkers.

**2.4. Intervention**

The SMART program guides learners to “delay judgment and pay greater attention to the novelty of the world” [17] and to reframe challenges using the higher principles of gratitude, compassion, acceptance, meaning, and forgiveness. The goals of the program are to enhance peace, joy, resilience, and altruism, and to reduce stress [23]. The program has two main components: (1) attention training and (2) developing a resilient mindset. Participants learn the neuroscientific principles underlying stress and resilience and receive guided and structured daily practices. An outline of the curriculum content is shown in Table 2.

Attention training is fostered through daily practices such as waking up in the morning with gratitude, finding novelty in loved ones, colleagues, and others, and sending a silent greeting of compassion to others throughout the day [23]. Resilient mindset is practiced through integrating the five higher principles in daily life (Table 2).

For the study, this program was administered with an initial 90-min session in which an investigator (A.S.) discussed the essential components of the SMART program with the participants. The format was participatory and informal to adapt to the individual group's needs and

**Table 2**  
Stress management and resiliency training program content outline.

| Topic                     | Content                                                                                                                                                                                                                                                                                                       | Practice                                                                                                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part 1: Gratitude         | Neurobiology of stress and the brain<br>Attention training—focusing on positive thoughts (gratitude)<br>Resilience is the core strength you use to lift the load of life                                                                                                                                      | Morning gratitude<br><i>Think of 5 people whom you appreciate and send silent gratitude</i><br>Gratitude jar<br><i>Write grateful note to yourself and save them in a jar.</i>                                                       |
| Part 2: Mindful Presence  | Present moment awareness<br>Finding novelty in the ordinary                                                                                                                                                                                                                                                   | Two-minute rule<br><i>Do not try to change or improve someone for at least the first 2 min you're together</i><br>Curious moments<br><i>Observe what's around you with mindful attention, with a deeper sense of curiosity.</i>      |
| Part 3: Kindness          | Changing the brain's innate wiring<br>Moving past tendencies of negativity and fear                                                                                                                                                                                                                           | Kind attention<br><i>Use your "kind eyes" to send a silent good wish to others, "I wish you well"</i>                                                                                                                                |
| Part 4: Resilient Mindset | Interpretation refinement<br>Resilient thinking<br>Reinforcing a positive mindset<br>Live by these timeless principles <ul style="list-style-type: none"> <li>● <i>Gratitude</i></li> <li>● <i>Compassion</i></li> <li>● <i>Acceptance</i></li> <li>● <i>Meaning</i></li> <li>● <i>Forgiveness</i></li> </ul> | Build resilient principles into your daily life<br>Interpret with compassion, assume positive intent<br>Reframe a difficult situation<br>Align your actions with your long-term meaning and purpose<br>Forgive as a gift to yourself |

preferences. Participants also received the book *The Mayo Clinic Guide to Stress-Free Living* and were given access to an online course and resources linked with the SMART program. The online program consisted of 12 modules that the participants were instructed to complete on their own time and at their desired pace. Weekly emails were sent to the participants for weeks 8 through 52 of the study. These emails provided additional perspectives related to the five principles of the program, as well as reminders to practice the principles. In addition, eight 1-hour teleconferences were provided at regular intervals. The teleconferences, facilitated by investigators (S.S.C, A.S.), provided participants with the opportunity to discuss their progress and address any concerns with the facilitators.

### 2.5. Statistical analysis

Participant characteristics at baseline and feedback related to program outcomes at the 1-year follow-up were summarized with appropriate descriptive summary statistics. Baseline characteristics between completers versus non-completers of the follow-up assessments were compared with Fisher's exact tests for categorical variables, and Wilcoxon rank-sum or t-tests for ordinal or continuous variables. All comparisons of the scored outcomes by time were focused on those who completed at least one follow-up assessment. In cases of missing data during follow-up, the last observed value was carried forward. The internal consistency of each survey scale was quantified with Cronbach's alpha. The outcomes were summarized with means and standard deviations at each time point. An overall effect of time on each outcome was assessed with linear regression models using generalized estimating equations (GEE) to account for repeated measures within individuals, assuming an exchangeable correlation structure. Pairwise comparisons between specific time points were also assessed from these models. The investigators did not have hypotheses regarding at which time points changes would occur, and therefore tested all possible changes across time. For each outcome, five comparisons were performed: baseline vs 2 months, 6 months, and 12 months; 2 months vs 6 months; and 6 months vs 12 months. To preserve an overall 5% type-I error rate across the five pairwise comparisons within each outcome assessed, *P* values less than 0.01 were considered statistically significant (Bonferroni adjustment). All analyses were performed by using SAS version 9.4 (SAS Institute Inc; Cary, NC).

### 2.6. Ethical considerations

The study was approved by Mayo Clinic's institutional review board,

and written consent was obtained from participants. All standards identified by the United States Federal Policy for the Protection of Human Subjects were followed.

## 3. Results

Among the 70 individuals who completed baseline assessments, 55 (78.6%) completed at least 1 follow-up survey, and this group formed the analysis set. Among these 55 individuals, most (51) completed at least two of the three follow-up assessments (30 completed all three, 21 completed two, and 4 completed only a single follow-up assessment). The reasons for non-response during follow-up are not known. Baseline characteristics of the 55 participants are shown in Table 3. As compared to the 55 individuals included in the analysis, the 15 who only completed the baseline assessment had lower QOL (average LASA score 32.3 versus 39.9, *P* = 0.02) and higher stress (average PSS score 8.5 versus 5.4, *P* = 0.001). Among the 55 individuals included in the analysis, those who completed all three follow-up assessments were older than those who completed 1–2 follow-ups (average age 50.6

**Table 3**  
Baseline participant characteristics (*n* = 55)<sup>a</sup>.

| Characteristic                                                         | Value      |
|------------------------------------------------------------------------|------------|
| Age, y                                                                 |            |
| Mean (SD)                                                              | 47.7 (9.9) |
| Median (IQR)                                                           | 50 (41–56) |
| Female gender, <i>n</i> (%)                                            | 48 (87.3)  |
| Non-Hispanic white, <i>n</i> (%)                                       | 55 (100)   |
| Employed as a teacher, <i>n</i> (%)                                    | 35 (63.6)  |
| Years of work experience (teacher, paraprofessional), ( <i>n</i> = 53) |            |
| Mean (SD)                                                              | 15.8 (9.6) |
| Median (IQR)                                                           | 16 (8–21)  |
| Marital status, <i>n</i> (%)                                           |            |
| Single                                                                 | 3 (5.5)    |
| Married                                                                | 45 (81.8)  |
| Divorced                                                               | 5 (9.1)    |
| Widowed                                                                | 2 (3.6)    |
| Number of children, <i>n</i> (%)                                       |            |
| 0                                                                      | 4 (7.3)    |
| 1                                                                      | 4 (7.3)    |
| 2                                                                      | 24 (43.6)  |
| 3                                                                      | 17 (30.9)  |
| 4                                                                      | 6 (10.9)   |

SD: standard deviation, IQR: interquartile range.

<sup>a</sup> Data include only those who had baseline and at least one follow-up evaluation.

**Table 4**  
Overall summary of scores, stratified by time.<sup>a</sup>

| Assessment <sup>b</sup>                                    | Time         |              |                           |              |
|------------------------------------------------------------|--------------|--------------|---------------------------|--------------|
|                                                            | Baseline     | 2 months     | 6 months                  | 12 months    |
| Generalized Anxiety Disorder 7-Item Scale Score, mean (SD) | 7.13 (4.65)  | 4.29(3.93)   | 4.06(3.50)                | 3.31 (3.13)  |
| Connor-Davidson Resilience Scale (2-item) Score, mean (SD) | 6.36 (1.11)  | 6.55(1.23)   | 6.65(1.11)                | 6.71 (1.17)  |
| Perceived Stress Scale 4-Item Score, mean (SD)             | 5.40(2.92)   | 4.29(2.77)   | 4.39(2.70)                | 3.93(2.63)   |
| Gratitude questionnaire score, mean (SD)                   | 35.69 (5.45) | 36.92 (4.78) | 38.62 (3.71) <sup>d</sup> | 38.65 (3.57) |
| Satisfaction with life score, mean (SD)                    | 24.76 (6.51) | 26.64 (6.01) | 27.04 (5.94)              | 28.00 (5.23) |
| Subjective happiness score, mean (SD)                      | 5.03 (1.09)  | 5.43 (1.05)  | 5.47 (0.97)               | 5.64 (0.97)  |
| Linear Analogue Self-Assessment Score, mean (SD)           | 39.95 (8.68) | 43.61 (8.51) | 43.82 (8.75)              | 45.76 (7.83) |

SD: standard deviation.  
<sup>a</sup> Data include only those who had baseline and at least one follow-up evaluation. The last observation carried forward was used in places of missing follow-up data (data carried forward for N = 8, 5, and 19 participants at 2-months, 6-months, and 12-months, respectively).  
<sup>b</sup> Final scores were all calculated as sums, except for the subjective happiness score, which uses mean values.  
<sup>c</sup> Pairwise comparisons with baseline values from GEE models (see Methods). Overall p-values for effect of time are provided in the text.  
<sup>d</sup> The difference in the gratitude questionnaire score between 2-month and 6-month scores also was significantly different ( $P = 0.005$ ).

versus 44.3,  $P = 0.02$ ); however, they did not differ significantly with respect to any of the baseline assessment scores.

The internal consistency was good for most of the survey scales. Cronbach's alpha was highest for satisfaction with life (alpha = 0.90), anxiety, subjective happiness, and LASA quality of life (alpha = 0.89 for each), followed by stress (alpha = 0.81), gratitude (alpha = 0.68), and resilience (alpha = 0.60, noting that this only included 2 items).

Significant improvements were noted throughout the course of the study for most outcomes assessed (Table 4). Anxiety and stress were each significantly lower at each follow-up survey (2, 6, and 12 months) compared with baseline (overall  $P < 0.001$  and 0.003, respectively). Gratitude was significantly higher at the 6- and 12-month follow-up surveys compared with baseline (overall  $P = 0.001$ ). Satisfaction with life, subjective happiness, and quality of life were significantly higher at each follow-up survey compared with baseline (overall  $P < 0.001$  for all). We did not observe any statistically significant changes in resilience over time (overall  $P = 0.23$ ).

The feedback with respect to program outcomes, provided at the 12-month follow-up, was predominantly favorable (Table 5). The majority of participants reported that the skills positively affected interactions with students (77.2%) and coworkers (72.2%), as indicated by a rating of 4–5 on a 5-point scale. Further, most respondents noted that the skills they learned helped to decrease their stress (63.9%) and anxiety (66.6%) levels (rating of 4–5 on a 5-point scale). Most (61%) reported practicing the principles of the SMART program at least weekly. A majority (55.6%) indicated that they would “very much” recommend the program to friends or loved ones. Participant comments regarding

**Table 5**  
Summary of program outcomes after 12 months.<sup>a</sup>

| Outcome                                                                                                                                  | n (%)     |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Did the skills you learned help decrease your stress level? (n = 36)                                                                     |           |
| 1 Not at all                                                                                                                             | 1 (2.8)   |
| 2                                                                                                                                        | 3 (8.3)   |
| 3                                                                                                                                        | 9 (25.0)  |
| 4                                                                                                                                        | 10 (27.8) |
| 5 Very much so                                                                                                                           | 13 (36.1) |
| Did the skills you learned help decrease your anxiety level? (n = 36)                                                                    |           |
| 1 Not at all                                                                                                                             | 2 (5.6)   |
| 2                                                                                                                                        | 2 (5.6)   |
| 3                                                                                                                                        | 8 (22.2)  |
| 4                                                                                                                                        | 12 (33.3) |
| 5 Very much so                                                                                                                           | 12 (33.3) |
| On average, during the past year, how often did you practice the principles of the Stress-Free Living Program? (n = 36)                  |           |
| Daily                                                                                                                                    | 8 (22.2)  |
| At least 3 times a week                                                                                                                  | 7 (19.4)  |
| At least once a week                                                                                                                     | 7 (19.4)  |
| A few times a month or less                                                                                                              | 14 (38.9) |
| Would you recommend the program we shared with you to your friends and loved ones to help decrease their stress and/or anxiety? (n = 36) |           |
| 1 Not at all                                                                                                                             | 0 (0)     |
| 2                                                                                                                                        | 1 (2.8)   |
| 3                                                                                                                                        | 8 (22.2)  |
| 4                                                                                                                                        | 7 (19.4)  |
| 5 Very much so                                                                                                                           | 20 (55.6) |
| Have the skills you learned positively impacted how you interact with students? (n = 35)                                                 |           |
| 1 Not at all                                                                                                                             | 1 (2.9)   |
| 2                                                                                                                                        | 2 (5.7)   |
| 3                                                                                                                                        | 5 (14.3)  |
| 4                                                                                                                                        | 15 (42.9) |
| 5 Very much so                                                                                                                           | 12 (34.3) |
| Have the skills you learned positively impacted how you interact with your coworkers? (n = 36)                                           |           |
| 1 Not at all                                                                                                                             | 1 (2.8)   |
| 2                                                                                                                                        | 1 (2.8)   |
| 3                                                                                                                                        | 8 (22.2)  |
| 4                                                                                                                                        | 16 (44.4) |
| 5 Very much so                                                                                                                           | 10 (27.8) |

<sup>a</sup> Data include only those who completed the final follow-up evaluation.

**Table 6**  
Participant comments about the program.

| Positive Aspects                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| “Participating in this program sparked my passion for wellness ... I was able to apply mindfulness to my classroom and incorporate a morning stretch routine to get students focused and ready to start their day.”                                                                          |
| “I enjoyed the book and workbook! Was great when we physically had the group together!”                                                                                                                                                                                                      |
| “The book has so much valuable information. I took notes as I read through it. Very thorough information. Very important.”                                                                                                                                                                   |
| “I am more accepting toward other people who act differently than me. I like sending silent blessings to those around me.”                                                                                                                                                                   |
| “The [online] modules to work through were very helpful.”                                                                                                                                                                                                                                    |
| “The skills were easy to integrate into daily life.”                                                                                                                                                                                                                                         |
| “I like the way the program was designed—starting with each principle and then focusing on the others over time. Easy to learn and put into practice!”                                                                                                                                       |
| “I enjoyed reading the emails from Dr. Sood. They were uplifting and applicable to my life. I mostly enjoyed our first meeting where we actually got to meet and listen to Dr. Sood.”                                                                                                        |
| <b>Areas for Improvement</b>                                                                                                                                                                                                                                                                 |
| “[I would like] more opportunities to gather as a group”                                                                                                                                                                                                                                     |
| “I would like more teleconferences where I can ask questions regarding student issues.”                                                                                                                                                                                                      |
| “The phone call-in sessions are not ideal. I was not able to participate in any of them due to time and schedule conflicts.”                                                                                                                                                                 |
| “I was disappointed more people didn't participate in the phone conferences. Perhaps there could be other avenues for reflection.”                                                                                                                                                           |
| <b>Other Comments</b>                                                                                                                                                                                                                                                                        |
| “I chose not to participate in the phone conversations from the start because I wanted to spend more time at my job. That was a bad choice. Because I spent too much time working on my job, I didn't spend any time working on me. As a result, I wasn't satisfied at work or with me.”     |
| “I followed the protocol very closely in the beginning, but several months into the program, I found it hard to keep on doing the exercises and stop myself from ruminating. Maybe having another in-person training session halfway through to remind/refresh/recharge [would be helpful].” |
| “Continue to look for ways to make it free and accessible to more people.”                                                                                                                                                                                                                   |

positive aspects of the program, as well as areas for improvement, are included in [Table 6](#).

#### 4. Discussion

This clinical trial involving 55 public school employees (predominantly teachers) showed that the SMART intervention was feasible (78.6% completion rate) and was associated with statistically significant improvements in anxiety, stress, gratitude, satisfaction with life, subjective happiness, and quality of life. Although the average resilience increased a small amount over the course of the study, it was not statistically significant. Most teachers reported that their interactions with students and colleagues improved as a result of the intervention. The qualitative feedback corroborated the quantitative findings noted in the study.

Despite the evidence supporting high stress levels experienced by teachers and the emotional demands associated with the profession, few high quality studies have tested interventions for reducing work-related stress in teachers [24]. Mindfulness training has the potential to promote teachers' habits of mind, occupational health, well-being, and their relationships with students [5]. The present study addressed some of the research gaps and intervention limitations described by the previous studies, including (1) a longitudinal design, (2) multi-informant measures, (3) first-person self-report measures, (4) assessment of impact of training on teachers' interactions with students, and (5) evaluation of an intervention with a relatively small time commitment compared with other mindfulness-based programs. Additionally, although this intervention required a relatively small investment of time from the participants, it yielded significant improvements in anxiety, stress, gratitude, satisfaction with life, subjective happiness, and quality of life.

High levels of stress can impair attention, working memory, and decision making [25]. Burned-out teachers are less likely to effectively

manage challenges in the classrooms, which leads to lower levels of on-task behavior in their students [25]. A negative feedback loop can develop in which difficult student behaviors contribute to an escalation in the emotional exhaustion of the teacher, which predisposes to worse student behaviors [26]. The results of this investigation suggest that a brief SMART program can lead to decreased anxiety, decreased stress, and improved quality of life for public school staff. These changes may in turn prevent burnout among teachers and allow them to more effectively manage classroom behavior and positively impact student learning and development.

Interestingly, although we observed an improvement in resilience, the changes were not statistically significant. This finding was consistent with previous observations by us and others that resilience, as measured by current scales, changes, but the absolute change is smaller compared with other well-being measures [18,19]. In addition, there is some evidence from previous research that stress and resilience are correlated [27], which was demonstrated in this study as well, with an overall correlation of  $-0.51$  between the two variables (higher resilience correlates with lower stress) across all time points.

Limitations of this study include the potential to reach a ceiling effect because highly motivated participants were likely recruited. We performed an open-label study intervention, which limited the ability to control for the placebo effect. This study lacked a control group and lacked diversity with respect to race/ethnicity in the study sample. By excluding the higher-stress and lower QOL participants who did not provide any follow-up responses, and by focusing on those who did participate in the follow-up assessments, this analysis may be more representative of a sample who is more willing to participate in such an intervention. Finally, although the use of a last-observation-carried-forward approach to handle missing follow-up data is conservative and may underestimate the true differences, we were still able to detect improvements with the study measures. An approach utilizing multiple imputation may have provided less-biased and potentially stronger estimates of the differences.

#### 5. Conclusion

In summary, this single-arm clinical trial showed promising impact of the SMART program for improving anxiety, stress, gratitude, satisfaction with life, subjective happiness, and quality of life among public school staff and teachers. Along with these positive psychological outcomes, the majority of the participants reported improvements in their interactions with students and colleagues as a result of the intervention. Given the prevalence of burnout among teachers, broader dissemination of the intervention is warranted, and larger, controlled prospective studies are recommended.

For future research, data from this pilot study will be used to plan larger investigations to assess effectiveness and broader applicability of the SMART program with public school staff. Future work will be structured as a randomized controlled trial to more accurately analyze the effect of the intervention, and we will include more diverse participants in an effort to improve generalizability of the results. Future research will also incorporate feedback from the participants of the current study, such as a greater number of teleconferences offered at various times and additional face-to-face meetings in a small group setting.

#### Conflicts of interest

Dr Sood is the owner of the Global Center for Resiliency and Wellbeing.

#### Impact and implications statement

Stress management and resilience training for public school teachers not only enhanced their wellbeing but also improved their interaction

with students for the vast majority of teachers.

### Role of the funding source

Internal funding from the Integrative Medicine and Health Research Committee was received for statistical analysis and interpretation of data. The funders had no role in the study design; in the writing of the manuscript; and in the decision to submit the manuscript for publication.

### Author contributions

Sherry S. Chesak, PhD, RN – Study conception and design, acquisition of data, analysis and interpretation of data, drafting of manuscript. Tejinder K. Khalsa, MD – Critical revision of manuscript. Anjali Bhagra, MD – Study conception and design, critical revision of manuscript. Sarah M. Jenkins, MS – study conception and design, analysis and interpretation of data, drafting of manuscript. Brent A. Bauer, MD – study conception and design. Amit Sood, MD – study conception and design, analysis and interpretation of data, critical revision of manuscript.

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