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ORIGINAL PAPER

Promoting Stress Management and Wellbeing in Educators: Feasibility and Efficacy of a School-Based Yoga and Mindfulness Intervention

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Abstract We evaluated the feasibility and efficacy of the Community Approach to Learning Mindfully (CALM) program for educators. CALM is a brief daily school-based intervention to promote educator social-emotional competencies, stress management, and wellbeing. Two middle schools were randomly assigned to waitlist control condition or the CALM program. Participants included 64 educators. Intervention sessions included gentle yoga and mindfulness practices and were offered 4 days per week for 16 weeks. Pre- and posttest measurements included self-report surveys of social-emotional functioning and wellbeing, blood pressure readings, and diurnal assays of cortisol. Compared to the control condition, CALM had significant benefits for educators' mindfulness, positive affect, classroom management, distress tolerance, physical symptoms, blood pressure, and cortisol awakening response. There were trend-level effects for two measures related to stress and burnout. No impacts were observed for relational trust, perceived stress, or sleep. Effect sizes for significant impacts ranged from 0.52 to 0.80. Educators found the intervention feasible and beneficial as a method for managing stress and promoting wellbeing. Initial evidence suggests that CALM has potential as a strategy to improve educators' social-emotional competence and wellbeing, prevent stress-related problems, and support classroom functioning.

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Introduction

Teaching is a stressful profession, involving caregiving demands, emotion management, and work overload (Montgomery and Rupp 2005). Most teachers now report being under great amounts of stress several days per week, and teacher ratings of job satisfaction recently reached a 25 year low among K-12 teachers in U.S. public schools (MetLife 2013). Although efforts to improve school climate have emphasized the importance of student social-emotional functioning (Durlak et al. 2011; Greenberg et al. 2003), educators' own social-emotional functioning and wellbeing have been largely overlooked (Jennings and Greenberg 2009).

Teachers are responsible for providing a stimulating learning environment to facilitate student academic outcomes and to provide a positive emotional climate to support student social-emotional functioning. Educators are constrained by the physical confines of a classroom, performing under a constant spotlight from students and administrators. To perform effectively, educators must cope effectively with their own emotional reactivity to student behaviors and a variety of physical and psychological stressors (Day and Qing 2009). Educators' experiences of work stress may lead to decreased performance and burnout as well as poor student outcomes (Jennings and Greenberg 2009).

While some research has focused on understanding educator stress and consequences (Montgomery and Rupp 2005), few professional development approaches have been tested to support educators' stress management and wellbeing. Recent

research suggests mindfulness may serve as a protective factor against stress and burnout and that interventions including contemplative practices may improve teachers' wellbeing and reduce their stress (Abenavoli et al. 2013, Roeser et al. 2012).

A wide body of research has demonstrated that contemplative practices can support many aspects of health and wellbeing. Contemplative interventions (CIs) take many forms, but most research has centered on training in mindfulness, mostly through Mindfulness Based Stress Reduction (MBSR; Kabat-Zinn 1990). Mindfulness involves sustained non-judgmental attention to present moment experience and an orientation of openness, curiosity, and acceptance towards experiences (Bishop et al. 2004; Kabat-Zinn 1990). Cultivating mindfulness is a core process of other contemplative practices (e.g., forms of meditation and yoga). The cultivation of positive emotion (e.g., compassion, love, acceptance, gratitude) is another key process for some CIs, such as loving-kindness meditation (Fredrickson et al. 2008).

Research on CIs within clinical and healthy adult populations has demonstrated their efficacy in reducing stress and improving mental health and wellbeing (Chiesa and Seretti 2009; Mars and Abbey 2010). CIs can alter the neural substrates underlying attentional regulation and executive functions, body awareness, emotion regulation, and perspectives on the self (Hölzel et al. 2011; Mind and Life Education Research Network 2012). These changes support improved psychological, physiological, and behavioral functioning. For teachers, this may translate to improved occupational engagement and wellbeing, classroom management, and creating a positive classroom climate (Roeser et al. 2012). Physiologically, CIs may result in lowered blood pressure, reduced inflammatory response, and alterations in stress responsivity (Field 2011; Kiecolt-Glaser et al. 2010).

Recent studies have begun to demonstrate that contemplative interventions are a promising and feasible strategy to prevent and mitigate the effects of educators' stress and to promote mindfulness in the classroom. Two recent studies have evaluated the effects of MBSR modified specifically to address the needs of teachers. One small pilot (n=18) with elementary teachers led to improvements in psychological distress, mindfulness, self-compassion, burnout, observed classroom performance, and performance on attention and emotion tasks (Flook et al. 2013). Intervention teachers remained stable in their morning peak cortisol levels, while control teachers showed a significant decline, which can be an indicator of the negative effects of stress. In another pilot with 36 high school teachers, a modified MBSR intervention promoted teachers' mindfulness, self-compassion, self-regulation, and sleep quality (Frank et al. 2013). The authors noted that participants responded favorably to this school-based model and opted to continue a school-based mindfulness practice group after the study had ended. Cultivating Awareness and Resilience in Education (CARE) is a CI that integrates emotion skills instruction, mindfulness practices, and compassion practices in five 6-h workshops over several months. A randomized trial of 50 teachers showed reductions in time pressure and burnout and improvements in mindfulness, emotion regulation, physical wellbeing, and teaching efficacy (Jennings et al. 2013). Another randomized trial tested the impacts of the SMART Program, an 8-week, 11-session CI which instructs teachers in various contemplative practices (e.g., mindfulness meditation, yoga, loving-kindness meditation) and employs instruction and discussion on applying mindfulness and compassion in teachers' professional lives (Roeser et al. 2013). Intervention teachers reported less stress, burnout, anxiety, and depression and higher mindfulness, self-compassion, and attention. There were no significant effects on physiological indices of blood pressure or salivary cortisol.

The CIs for educators reviewed above are diverse in their content and format, but most primarily focus on training in mindfulness and compassion. Yoga also holds promise as a primary modality for promoting educators' wellbeing. Yoga is a contemplative practice, which, in most Western teaching, involves physical movements and postures, intentional breathing practices, meditation, and ethical precepts (although these are rarely formally taught). Yoga is an empirically validated CI for stress-related clinical disorders showing benefits for wellbeing, pain, sleep quality, cardio-respiratory functioning, and blood pressure (Field 2011). Yoga interventions with normal populations indicate reductions in anxiety, depression, and sleep-impairment and improved wellbeing (Chong et al. 2011). Yoga is hypothesized to achieve these improvements in mental and physical wellbeing through improvements in cognitive, emotional, and behavioral self-regulation (Gard et al. 2014). Although some CI programs for educators (e.g., MBSR, Flook et al. 2013; Frank et al. 2013; SMART, Roeser et al. 2013) do include some yoga practice, there is scarce research on the feasibility and effectiveness of primarily yoga-based programs to support educators' wellbeing and professional functioning. One recent pilot offered an after-school yoga program to a small group of teachers from multiple schools (Ancona and Mendelson 2014). Preliminary outcome data suggested that teachers may have benefited from the program in the areas of stress and burnout, but recruitment and after-school commitment were notable challenges to feasibility.

In the current study, we investigate the feasibility and efficacy of a new yoga-based CI, CALM (Community Approach to Learning Mindfully), as a support for educator wellbeing. CALM is based in gentle yoga and mindfulness practice and is hypothesized to improve emotional functioning and stress management as well as teaching, health, and wellbeing (see Fig. 1). The innovative, school-based, daily, morning format of CALM was designed to increase accessibility and promote skill transfer. CALM's format provides a brief daily practice and provides participants with practices that can be extended to other contexts throughout the day. This on-site format was also chosen with the intention that promoting a group

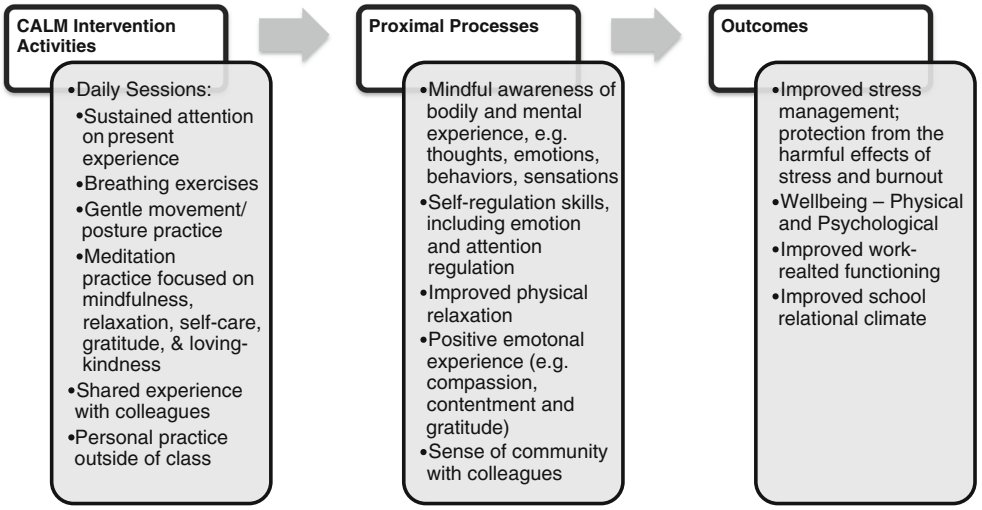

Fig. 1 CALM Logic Model

commitment to self-care and wellbeing might foster a positive climate for faculty and staff.

Method

Participants

All staff in two middle schools were eligible if they were not currently pregnant or under a doctor's orders to refrain from physical activity. Participants were recruited through meetings, announcements, and brochures, with a goal of recruiting 30–35 per school. Sixty-four educators (42 teachers, 22 paraprofessionals, learning support, etc.) in two schools (intervention school, n=34; control school, n=30) enrolled. The participants were predominantly white (98 %), female (88 %), had a mean age of 43 years (SD=12.53, Min=21, Max=69), and a mean household income of $80,000–89,000 (Min=$20–29 K, Max=over $200 K). Participants had an average of 14 years teaching experience (SD=9.01, Min=0, Max=39). Most had attained a bachelor's degree (86 %), and 38 % had attained a master's or specialist degree. Participants were unaware of their school's intervention assignment until after pretest.

Procedure

All intervention and data collection procedures were approved by the university's IRB. The study utilized an experimental waitlist control design. Two middle schools in the same district, serving similar populations, were randomized to receive CALM in the first year (intervention) or second year after follow-up data had been collected. Participants were paid for assessments and offered the CALM program either in year 1 or 2.

The 64 intervention sessions, each lasting approximately 20 min, were offered in the school building four days/week for 16 weeks before school. Sessions were taught by a certified yoga instructor with experience in other meditation practices. CALM is based in gentle yoga and mindfulness practices (Harris and Hudecek 2013). The intervention was manualized, and each week involved a different thematic focus (e.g., present-centered awareness, balance, acceptance, contentment) with variations on the theme in each of the four daily sessions. Intervention sessions were scripted and a typical session included (a) 3 min of centering and setting an intention for the practice; (b) 2 min of breathing practices; (c) 7–10 min of movement/posture practice; (d) revisiting the breathing practice; (e) 4 min of a relaxation/meditation practice (varied focus on relaxation, mindfulness, self-care, compassion, loving-kindness, and gratitude); and (f) 1-min closing practice involving setting an intention for the workday. In addition, the focal skills and intentions for each session, e.g., "beginner's mind," present-centered awareness, acceptance, etc., were integrated into the instruction of the movement/posture practices.

To increase accessibility for participants of all fitness levels and to allow for participation in work clothes, options were always given for mat or chair-based practice. Participants were always provided both a mat and a chair. Movement practices usually included a gentle warm-up sequence of postures coordinated with breath, modified sun salutations, and additional postures that varied weekly depending on the focal practice for the week (e.g., standing poses, balance poses, back bends). Breathing exercises also rotated weekly and included practices such as diaphragmatic breathing, "three-part breath," and alternate nostril breathing. The intention was to provide instruction and experience in a variety of practices so that participants would have a menu of options from which to build their own personal practice.

Participants were not expected to attend every session but were encouraged to attend at least 2 days/week and to use practices outside of the sessions. Participants received weekly personal practice cards that provided examples of when and how specific brief strategies might be used during the school day to manage stress and support wellbeing. These personal practice cards included written instructions for one specific focal practice taught during the week's classes. They also included a summary of the curriculum focus for the week (the conceptual theme, the focal movement skills, and breathing practice) and a written reflection connecting the conceptual theme to professional wellbeing.

Participant Assessments

Data were collected through three methods: online self-report, in-person physiological assessment, and self-administered saliva collection. Pretest assessments were administered in the Fall of year 1, and posttest assessments were administered in the Spring of year 1 post-intervention. Online questionnaires required about 30 min. In-person physiological assessments (15 min) were conducted at schools. At pre- and posttest, participants collected saliva during one mid-week regular workday. Saliva was collected before getting out of bed, 30 min after waking, at lunchtime, and bedtime. Participants were given detailed written instructions and in-person training regarding saliva collection. Samples were refrigerated overnight and retrieved daily at the schools. They were stored at −80° until assays commenced.

Implementation Feasibility and Fidelity Data

The instructor took attendance and completed an implementation self-evaluation after each intervention session. In addition, trained observers rated 20 % of intervention sessions. Fidelity was measured for each session through ratings of adherence to each content component by both self-evaluation and observer measures. Participants provided perceptions of feasibility and self-reports of personal practice frequency at posttest.

Measures

Self-report assessments included various measures of (1) mindfulness and emotional functioning, (2) teaching efficacy, (3) stress and burnout, and (4) wellbeing. Physiological assessments of wellbeing included blood pressure and salivary cortisol.

Mindfulness

The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006) assessed multiple dimensions of mindfulness and includes a total of 39 items, each rated on 5-point rating scale (1=*never or very rarely true*; 5=*very often or always true*). The *degree of observation* subscale (pretest α=00.79; posttest α=00.82) includes 8 items about participants' tendency to notice bodily sensations, thoughts, and emotions (e.g., "I pay attention to how my emotions affect my thoughts and behavior"). The *capacity for description* subscale (pretest α=00.88; posttest α=00.87) includes 8 items about participants' ability to verbally express internal experiences (e.g., "I'm good at finding words to describe my feelings"). The *acting with awareness* subscale (pretest α=0.93; posttest α=00.94) includes 8 items about participants' tendency to pay attention to the present moment (e.g., "When I do things, my mind wanders off and I'm easily distracted" [reversed]). The *non-judgment* subscale (pretest α=00.93; posttest α=00.93) includes 8 items about participants' tendency to experience thoughts and feelings without judging them ("I make judgments about whether my thoughts are good or bad" [reversed]). Finally, the *non-reactivity* subscale (pretest α=00.76; posttest α=00.86) includes 7 items about participants' ability to experience thoughts and feelings without having an emotional or behavioral reaction to them (e.g., "When I have distressing thoughts or images, I 'step back' and am aware of the thought or image without getting taken over by it").

Affect

The Positive and Negative Affect Schedule—Short Form (PANAS; Thompson 2007; Watson et al. 1988) assessed participants' positive and negative affect with 2 subscales. Participants rated the extent to which they experienced 5 positive and 5 negative emotions "during the past few weeks" on a 5-point scale (1=*very slightly or not at all*; 5=*extremely*). The *positive affect* subscale (pretest α=00.86; posttest α=00.88) included emotion words such as alert, inspired, and attentive. The *negative affect* subscale (pretest α=00.81; posttest α=00.80) included emotion words such as upset, hostile, and ashamed.

Emotion Regulation

The Emotion Regulation Questionnaire (ERQ; Gross and John 2003) contains 2 subscales that assess the habitual use of two emotion regulation strategies. The *cognitive reappraisal* subscale (pretest α=00.93; posttest α=00.87) includes 6 items rated on a 7-point scale (1=*strongly disagree*; 7=*strongly agree*) about participants' tendency to intentionally change their thinking in order to experience more positive emotion and/or less negative emotion (e.g., "When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm"). The *expressive suppression* subscale (pretest α=00.77; posttest α=00.78) includes 4 items rated on the same 7-point scale about participants' tendency

not to share their feelings with others (e.g., "I keep my emotions to myself").

Distress Tolerance

The Distress Tolerance Scale (DTS; Simons and Gaher 2005) assesses the extent to which individuals experience negative emotions without acting to avoid, alleviate, or become absorbed in them. The DTS includes 4 subscales and a total of 15 items, which are rated on a 5-point scale (1=*strongly agree*; 5=*strongly disagree*): the tolerance for emotional distress subscale (3 items; e.g., "Feeling distressed or upset is unbearable to me"), the absorption in negative emotions subscale (3 items; e.g., "My feelings of distress are so intense that they completely take over"), the appraisal subscale (6 items; e.g., "Other people seem to be able to tolerate feeling distressed or upset better than I can"), and the effortful regulation of distress subscale (3 items; e.g., "I'll do anything to stop feeling distressed or upset"). These 4 subscales are averaged to create a second-order scale score (pretest α=00.89; posttest α=00.84) for general distress tolerance.

Relational Trust

Teacher-Teacher Relational Trust (Bryk and Schneider 2002) was measured with a six-item scale (pretest α=00.91; posttest α=00.86), assessing the degree to which teachers felt trust and respect with other teachers in their school (e.g., "Teachers in this school trust each other"). Each item was rated on a 4-point scale (1=*strongly disagree OR not at all*; 4=*strongly agree OR to a great extent*).

Teaching Efficacy

Educators' efficacy was assessed with a subset of items rated on a 9-point scale (1=*nothing*; 9=*a great deal*) from the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran and Hoy 2001). Participants' ability to use a variety of effective teaching methods was assessed with 4 items from the *instructional practices* subscale (e.g., "To what extent can you craft good questions for your students?"), which demonstrated good internal consistency in the current sample at pre (α=0.86), though internal consistency was lower at post (α=0.69). The *classroom management* subscale (pretest α=00.90; posttest α=00.88) included 4 items that assessed participants' ability to prevent and manage disruptive behavior in the classroom (e.g., "How much can you do to control disruptive behavior in the classroom?"). Finally, the *student engagement* subscale (pretest α=00.82; posttest α=00.87) included 4 items that measured participants' ability to motivate and involve students in their learning (e.g., "How much can you do to get students to believe they can do well in school work?").

Time Urgency

Nine *time urgency* items (pretest α=00.80; posttest α=00.83) rated on a 5-point scale (1=*strongly disagree*; 5=*strongly agree*) assessed feelings of task-related time pressure and general hurry (Landy et al. 1991; e.g., "I find myself hurrying to get to places even when there is plenty of time").

Perceived Stress

Four items (pretest α=00.88; posttest α=00.85) from the Perceived Stress Scale (Cohen, Kamarck, and Mermelstein, 1983), each rated on a 5-point scale (0=*never*; 4=*very often*), assessed the extent to which participants experienced difficulties and felt unable to handle stress (e.g., "In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?").

Professional Burnout

Educator burnout was assessed with the Maslach Burnout Inventory—Educators Survey (MBI; Maslach and Jackson 1981). The MBI includes 3 subscales and a total of 22 items rated on a 7-point scale (0=*never*; 6=*every day*). The extent to which participants felt drained from their work (e.g., "I feel emotionally drained from my work") was assessed with the 9-item *emotional exhaustion* subscale, (pretest α=00.91; posttest α=00.92). The 8-item *personal accomplishment* subscale (pretest α=00.82; posttest α=00.86) assessed participants' tendency to feel efficacious in their work with students (e.g., "I deal very effectively with the problems of my students"). Finally, the extent to which participants felt disconnected from and hardened towards their students was assessed with the 5-item *depersonalization* subscale (e.g., "I don't really care what happens to some students"). This subscale demonstrated adequate internal consistency at pre (α=0.73), but reliability decreased notably at post (α=0.54), so findings regarding this subscale are interpreted with caution.

Physical Symptoms

The Daily Physical Symptoms scale (Larsen and Kasimatis 1991) was used to assess participants' experience of a variety of current physical symptoms. Using a dichotomous scale (0=*no*; 1=*yes*), participants indicated whether they experienced 27 possible symptoms (e.g., headache, backache, nausea, dizziness) on the day of administration. Participants' *physical symptoms* score was computed as a percent of the 27 possible symptoms.

Sleep-Related Impairment

The PROMIS Sleep-Related Impairment scale (Buysse et al. 2010) was used to measure participants' experience of

problems related to poor sleep over the last 7 days. A total score (pretest α=00.93; posttest α=00.92) was computed from eight items (e.g., "I had a hard time getting things done because I was sleepy") that were rated on a 5-point scale (1=*not at all*; 5=*very much*).

Blood Pressure

Blood pressure was measured during the in-person assessments using an Omron® HEM-780 Automatic Blood Pressure Monitor with ComFit™ Cuff. Blood pressure readings were taken three times, waiting 1 min between each reading. Averages were computed for systolic and diastolic blood pressure (SBP and DBP) by taking a mean of the 2nd and 3rd readings.

Cortisol

Cortisol assays were completed by the Biomarker Core Lab at Pennsylvania State University. Duplicate samples from each participant for four times of day were assayed using commercially available immunoassay kits, and retesting was conducted for any duplicate assays that varied by more than 5 % error. Duplicate cortisol values were averaged and then converted nmol/L to produce values for analysis. For salivary assays, inter-assay covariances were less than 10 %, and intra-assay covariances were less than 5 %. Cortisol area under the curve (AUC) with respect to ground was computed with a formula that accounts for variability in time intervals between measurements (Pruessner et al. 2003). Cortisol awakening response (CAR) was computed by subtracting the waking hormone level from the level observed 30 min past waking (e.g., Grossi et al. 2005). To correct for skew and kurtosis, a log transformation was applied to cortisol AUC, and those log-transformed variables are used in the current analyses.

Data Analyses

Analysis of covariance (ANCOVA) models tested intervention impacts with the following covariates: pretest level of each outcome variable, gender, and years teaching. Two-tailed significance with an alpha level of 0.05 was used, but given the reduced power from a small sample, α=0.10 was used to indicate noteworthy trends. Analyses followed an intent-to-treat design, and all participants were included in the analyses regardless of their participation in the intervention. Effect sizes (Cohen's *d*) and confidence intervals were calculated according to Smithson (2003) using the *t* test of the intervention parameter in each ANCOVA model.

Results

The mean adherence score for instructor self-evaluations was 3.9 out of 4; the mean from observer ratings was 3.77, indicating CALM was implemented with fidelity. Participants rated the length and duration as "just right." The majority of participants agreed it was feasible to attend CALM the recommended 2 days/week (72 %), in the mornings before school (59 %), in regular work clothes (90 %), and to practice skills outside of class (94 %). Most participants (90 %) indicated they would continue participating if the program was offered again; 94 % indicated they would recommend the program to other school personnel.

Average attendance was 24 sessions (min=0, max=59) and 10 weeks (min=0, max=16). Fifty-six percent attended at least once per week; 32 % attended at least twice per week. One participant never attended. Participants reported engaging in each of 6 types of personal practice (e.g., intention-setting, breathing, movement) on average, about once per week.

At posttest, one control participant did not provide data, bringing the analytic sample to 63. See Fig. 2 for participant flow. Table 1 displays pretest and posttest unadjusted means. There were two baseline differences. Intervention group educators were higher in positive affect at baseline (t=2.73, p<0.01), and control group educators were higher in efficacy for student engagement (t=−2.01, p<0.05). The intervention was associated with statistically significant posttest impacts (p<0.05) on seven outcomes and notable trends (p<0.10) for two other outcomes. See Tables 2, 3, 4, and 5.

At posttest, CALM participants scored significantly higher in one aspect of mindfulness: mindful observation (F(1.58)= 4.91, p<0.05, d=0.56). Intervention participants also had significantly improved scores on distress tolerance (F(1.56)= 9.76, p<0.01, d=0.80) but not the other two emotion regulation strategies. Intervention participants also had significantly improved scores compared to controls on positive affect (F(1.58)=8.53, p<0.01, d=0.74) but not negative affect.

CALM participants improved significantly in their efficacy for classroom management relative to control participants (F(1.53)=4.18, p<0.05, d=0.54). There were no effects on efficacy for instructional practice or student engagement. There were no significant impacts of the intervention on relational trust.

CALM participants improved in two aspects of work-related stress compared to control participants: there were trend-level impacts on time urgency (F(1.58)=2.93, p<0.10, d=−0.43) and MBI depersonalization (F(1.56)=3.49, p<0.10, d=−0.48). There were no significant differences in perceived stress or the other dimensions of burnout.

CALM participants reported significantly fewer daily physical symptoms compared to controls (F(1.57)=4.39, p<0.05, d=−0.53). Differences between the two groups in sleep-related impairment were not significant.

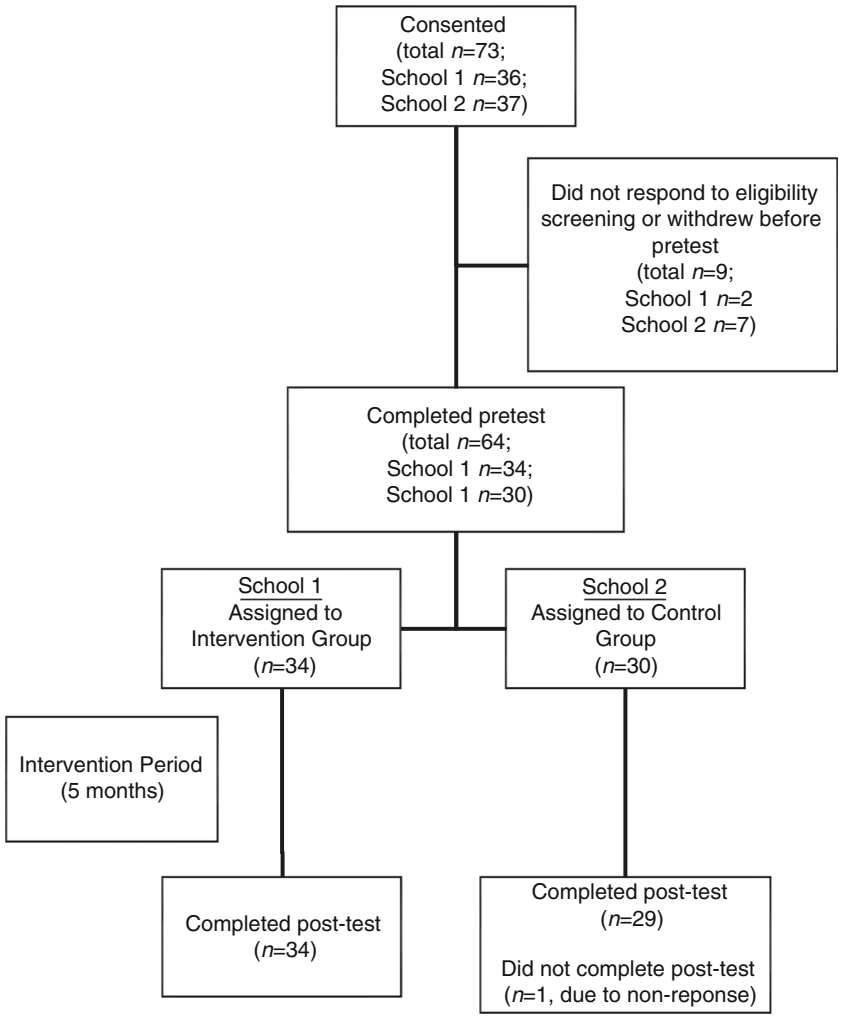

Fig. 2 Participant flow

ANCOVA models examining blood pressure outcomes included a code for time of measurement (morning or afternoon) as an additional covariate. CALM participants showed a significant lowering of their DBP compared to controls ($F(1.55)=4.07$, $p<0.05$, $d=-0.52$), but the effect for SBP was non-significant.

ANCOVA models for cortisol included presence of steroidal/hormonal medications as an additional covariate. There was a significant intervention effect on CAR ($F(1.54)=5.88$, $p<0.05$, $d=-0.64$); at posttest, CAR was less steep in controls than in the CALM group. Follow-up analyses revealed this effect was due to an increased waking level in the control group, while their peak level 30 min after waking remained stable. At posttest but not pretest, the control group's waking cortisol level was significantly higher than that of the CALM group ($F(1.55)=9.96$, $p<0.01$), controlling for baseline level, gender, years teaching, and hormonal/steroidal medications (Fig. 3). There was no significant impact on AUC.

Discussion

This study investigated whether a brief daily yoga-based CI implemented at school was feasible and efficacious for educators' wellbeing and functioning. Results suggest that CALM was feasible to implement with fidelity and was well received by educators. In addition, CALM has promise for promoting mindfulness and emotional functioning, reducing time urgency and burnout, promoting classroom efficacy, and improving self-report and physiological indicators of wellbeing. Small to moderate effect sizes were observed for most outcomes.

A key domain of proximal change hypothesized by the CALM logic model is educators' mindfulness and emotional functioning. CALM aimed to promote adaptive emotion regulation through promoting mindful awareness, acceptance, capacity to tolerate emotional perturbations, and reduced reactivity (Baer 2003; Chambers et al. 2009). Additionally, specific practices of the CALM program (e.g., loving-kindness and gratitude) were intended to facilitate the awareness and

Table 1 Unadjusted pretest and posttest mean comparison for all outcome measures

	Intervention				Control			
	Pre		Post		Pre		Post	
Outcome measure	*M*	(SD)	*M*	(SD)	*M*	(SD)	*M*	(SD)
FFMQ observe	3.29	(0.65)	3.56	(0.61)	3.26	(0.60)	3.30	(0.64)
FFMQ describe	3.56	(0.62)	3.65	(0.58)	3.54	(0.65)	3.59	(0.65)
FFMQ awareness	3.33	(0.58)	3.51	(0.55)	3.22	(0.85)	3.34	(0.88)
FFMQ non-judgment	3.36	(0.83)	3.64	(0.80)	3.39	(0.91)	3.53	(0.87)
FFMQ on-reactivity	3.26	(0.52)	3.32	(0.55)	3.08	(0.51)	3.20	(0.64)
ERQ reappraisal	5.14	(1.08)	5.27	(0.82)	4.77	(1.24)	5.18	(1.18)
ERQ suppression	3.44	(1.00)	3.22	(1.16)	3.58	(1.40)	3.49	(1.05)
Distress tolerance	3.72	(0.79)	3.96	(0.64)	3.66	(1.02)	3.63	(0.90)
Positive affect*	3.51	(0.64)	3.70	(0.69)	3.15	(0.74)	3.24	(0.77)
Negative affect	2.00	(0.78)	1.94	(0.60)	2.08	(0.85)	1.98	(0.78)
TSES student engagement*	6.35	(1.18)	6.57	(1.31)	6.95	(1.13)	6.71	(1.43)
TSES classroom mgmt	7.55	(1.02)	7.74	(0.96)	7.35	(1.09)	7.36	(1.01)
TSES instructional practices	7.11	(1.45)	7.61	(0.93)	7.66	(0.92)	7.42	(0.97)
Relational trust	3.45	(0.50)	3.38	(0.42)	3.22	(0.59)	3.18	(0.56)
Perceived stress	1.42	(0.87)	1.15	(0.84)	1.44	(0.88)	1.34	(0.92)
Time urgency	3.67	(0.52)	3.42	(0.51)	3.62	(0.56)	3.52	(0.70)
MBI emotional exhaustion	23.53	(11.38)	22.21	(10.25)	25.90	(13.30)	25.57	(14.23)
MBI personal accomplishment	39.82	(6.69)	39.68	(6.31)	38.85	(6.49)	37.14	(7.36)
MBI depersonalization	5.15	(5.69)	4.50	(3.42)	5.62	(4.44)	6.08	(5.05)
Daily physical symptoms	0.13	(0.07)	0.10	(0.08)	0.12	(0.08)	0.12	(0.09)
Sleep-related impairment	18.71	(7.03)	17.47	(6.10)	20.60	(7.03)	20.00	(7.29)
Systolic BP	114.3	(14.07)	109.7	(13.13)	117.9	(12.69)	116.2	(14.20)
Diastolic BP	78.32	(11.30)	75.37	(10.74)	81.76	(9.51)	81.31	(11.15)
Cortisol awakening response	6.82	(6.66)	7.51	(5.10)	7.29	(7.74)	3.27	(8.56)
Cortisol AUC	4.53	(0.29)	4.53	(0.41)	4.59	(0.33)	4.63	(0.33)

*Baseline differences significant at the $p<.05$ level

Table 2 Intervention effects on mindfulness and emotional functioning: adjusted posttest means, ANCOVA results, and effect sizes

	Adjusted posttest mean and standard error of the mean							
Outcome	Intervention *M* (SE)		Control *M* (SE)		*F*	*p*	*d*	CI
Mindfulness								
Observe	3.63	(0.10)	3.38	(0.10)	4.91	0.030	0.56	[0.05, 1.06]
Describe	3.71	(0.09)	3.66	(0.09)	0.32	0.570	0.14	[−0.35, 0.64]
Awareness	3.51	(0.09)	3.40	(0.10)	1.02	0.317	0.26	[−0.24, 0.75]
Non-judgment	3.96	(0.12)	3.74	(0.12)	2.69	0.107	0.41	[−0.09, 0.91]
Non-reactivity	3.23	(0.10)	3.26	(0.10)	0.07	0.796	−0.07	[−0.56, 0.43]
Emotion regulation								
Reappraisal	5.34	(0.18)	5.24	(0.19)	0.23	0.633	−0.12	[−0.62, 0.38]
Suppression	3.34	(0.20)	3.12	(0.21)	1.00	0.322	−0.25	[−0.75, 0.25]
Distress tolerance	3.77	(0.09)	4.10	(0.10)	9.76	0.003	0.80	[0.27, 1.32]
Emotion experience								
Positive affect	3.45	(0.12)	3.85	(0.12)	8.53	0.005	0.74	[0.22, 1.25]
Negative affect	1.88	(0.12)	1.89	(0.12)	0.00	0.973	0.01	[−0.49, 0.50]

Note: Covariate-adjusted posttest means obtained using LS Means in SAS Proc GLM

Table 3 Intervention effects on teaching outcomes: adjusted posttest means, ANCOVA results, and effect sizes

Outcome	Adjusted posttest mean and standard error of the mean				*F*	*p*	*d*	CI
	Intervention *M* (SE)		Control *M* (SE)					
Teaching efficacy								
Student engagement	6.83	(0.28)	6.69	(0.27)	0.17	0.682	0.11	[−0.41, 0.63]
Classroom management	7.93	(0.17)	7.54	(0.17)	4.18	0.046	0.54	[0.01, 1.06]
Instructional practices	7.67	(0.16)	7.55	(0.16)	0.44	0.509	0.18	[−0.36, 0.71]
Relational trust	3.31	(0.06)	3.30	(0.07)	0.02	0.877	0.04	[−0.46, 0.55]

Note: Covariate-adjusted posttest means obtained using LS Means in SAS Proc GLM

savoring of positive emotion. As hypothesized, CALM participants showed significant improvement on mindfulness and emotional functioning. Compared to controls, they increased on the mindfulness dimension of *degree of observation*. It is not surprising that a yoga-based program might result in such improvements in the mindfulness dimension of *degree of observation*, which may be especially indicative of body awareness (Hölzel et al. 2011). However, the program aims to promote other dimensions of mindfulness as well. Effect size estimates indicate the CALM group showed improvement in other dimensions of mindfulness, although not to a statistically significant degree at posttest. Future quantitative and qualitative work should further investigate participants' development of mindfulness in the context of CALM.

Additional impacts were observed on positive affect and distress tolerance, which is conceptualized as a meta-regulation process of how individuals' react to uncomfortable emotions. CALM did not impact negative affect or cognitive emotion regulation strategies measured by the ERQ. This pattern suggests that CALM did not alter the frequency of negative affect but instead helped participants to cope more effectively with negative emotions and distress. This is consistent with Fredrickson and colleagues' (2008) research, in which a workplace loving-kindness meditation intervention increased positive emotion and wellbeing while negative emotions remained stable. It is also congruent with conceptual models of mindful emotion regulation (e.g., Baer 2003; Biglan et al. 2008; Chambers et al. 2009) which emphasize greater acceptance of emotion and less mental and behavioral reactivity to emotion (e.g., tendencies to become absorbed in or attempt to modify emotional experience). No differential changes were observed in suppression or reappraisal of emotion.

CALM was effective in supporting educators' classroom experience; participants reported increased efficacy in classroom management. Although significant effects were not observed for the other two domains of efficacy, the means for these also trended in the same direction. In future studies, such findings should be verified by other methods including observations of teaching. We also hypothesized that the shared experience of practicing self-care with colleagues might improve the sense of community or relational climate, but this was not observed with the relational trust measure.

CALM participants improved in both subjective and physiological wellbeing. They decreased in self-reported daily physical symptoms. In addition, two physiological measures displayed intervention benefits: cortisol and blood pressure. While CALM educators remained stable in their cortisol awakening responses at posttest, the awakening response of the control group was blunted. This pattern was driven by an increased waking cortisol level in the control group at posttest.

Table 4 Intervention effects on stress-related outcomes: adjusted posttest means, ANCOVA results, and effect sizes

Outcome	Adjusted posttest mean and standard error of the mean				*F*	*p*	*d*	CI
	Intervention *M* (SE)		Control *M* (SE)					
Perceived stress	1.05	(0.13)	1.28	(0.13)	2.55	0.116	−0.41	[−0.91, 0.10]
Time urgency	3.43	(0.07)	3.62	(0.08)	2.89	0.095	−0.43	[−0.93, 0.07]
Burnout								
Emotional exhaustion	22.70	(1.67)	24.52	(1.60)	1.00	0.322	−0.25	[−0.75, 0.25]
Personal accomplishment	38.74	(0.73)	38.00	(0.71)	0.82	0.368	0.23	[−0.27, 0.74]
Depersonalization	4.30	(0.73)	5.79	(0.70)	3.49	0.067	−0.48	[−0.99, 0.03]

Note: Covariate-adjusted posttest means obtained using LS Means in SAS Proc GLM

Table 5 Intervention effects on subjective and physiological wellbeing outcomes: adjusted posttest means, ANCOVA results, and effect sizes

Outcome	Adjusted posttest mean and standard error of the mean				F	p	d	CI
	Intervention M (SE)		Control M (SE)					
Physical symptoms	0.08	(0.02)	0.11	(0.01)	4.39	0.041	−0.53	[−1.04, −0.02]
Sleep-related impairment	17.12	(1.02)	18.65	(0.99)	1.85	0.179	−0.34	[−0.84, 0.16]
Blood pressure								
Systolic	111.95	(1.84)	115.08	(1.81)	2.32	0.133	−0.39	[−0.90, 0.12]
Diastolic	76.21	(1.40)	79.37	(1.37)	4.07	0.049	−0.52	[−1.03, 0.00]
Cortisol								
Awakening response	8.22	(1.65)	3.91	(1.53)	6.04	0.017	0.64	[0.11, 1.15]
AUC	4.60	(0.09)	4.65	(0.08)	0.37	0.544	−0.16	[−0.67, 0.35]

Note: Covariate-adjusted posttest means obtained using LS Means in SAS Proc GLM

Although research on the effects of some stress-related conditions, like depression and burnout, on CAR has been inconsistent, both physical and psychiatric conditions have been associated with less steep or blunted CAR (Fries et al. 2009). As the CAR is a fairly stable characteristic, the changing waking levels in control participants over the school year suggest the possibility that an adverse effect of work-related stress was prevented in the intervention group.

CALM showed a significant effect on blood pressure, which is associated with stress and is a key indicator of cardiovascular functioning and risk for poor health. CALM participants displayed a reduction in diastolic blood pressure over the school year compared to the controls. Although not a high-risk sample, the size of the reduction found in DBP (about 4 points, effect size=−0.52) is consistent with those observed in lifestyle interventions for hypertension, although SBP is more predictive of cardiovascular health (Chobanian et al. 2003).

These results replicate aspects of previous work on educator CIs (Jennings et al. 2013; Roeser et al. 2013), but they are differentiated from previous studies in two main areas: physiological impacts and positive affect. First, the unique nature of a daily yoga-based practice with physical movement and regulated breathing exercises might have particular potential for affecting the body's response to stress. Second, previous CIs for educators have not demonstrated effects on positive affect, but CALM was associated with a significant improvement. This may be due to the daily nature of the practices and the use of loving-kindness meditation, which may be especially salient in the sustained increase of positive affect (Fredrickson et al. 2008).

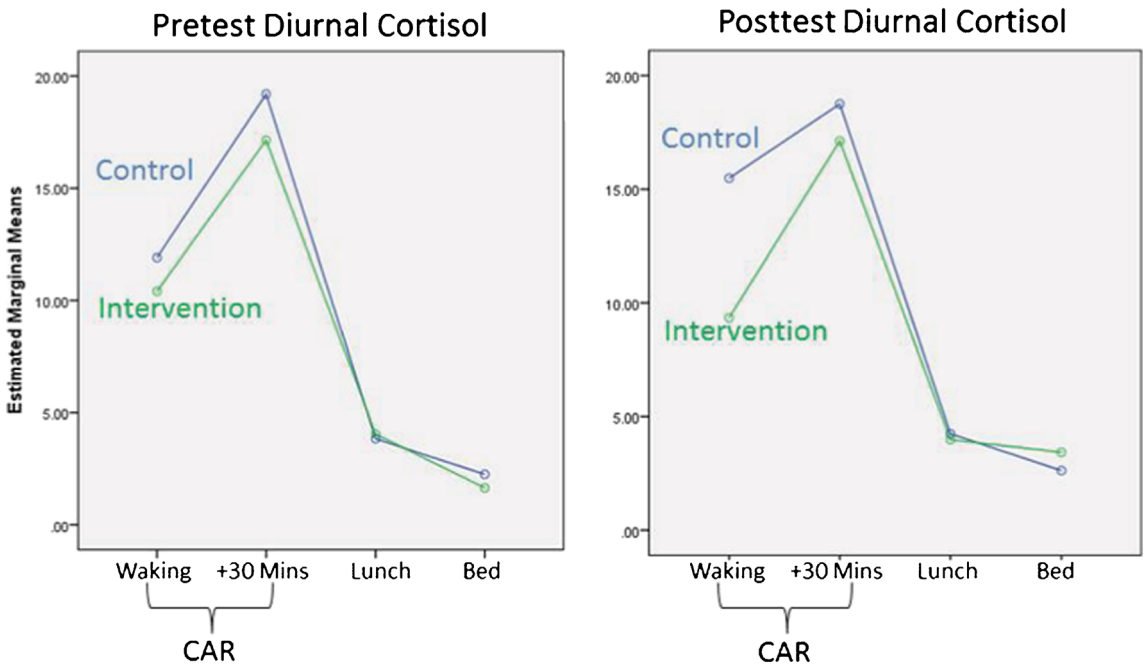

Fig. 3 Intervention effect on cortisol awakening response

Strengths

This study had a number of strengths, including an innovative intervention approach, diverse outcome measurement, and implementation monitoring. The measurement protocol was diverse and included both self-report and physiological assessments. Outcomes were conceptualized broadly in order to measure processes hypothesized as key proximal mediators and explore other hypothesized outcomes. This study also addressed gaps in the literature by exploring yoga as a central modality and by demonstrating impacts of brief daily contemplative practices. This study was, to our knowledge, the first intervention study to implement such an intervention with a professional community of educators (both teachers and other personnel) on-site at their school in a brief and accessible morning program. The unique features of CALM (e.g., its brief sessions, frequency, embedded morning delivery, and supports for personal practice) may increase acceptability and feasibility for educators. It may also serve to promote a healthier overall climate around self-care and proactive stress management, ultimately affecting change in the culture of the school. CALM adds mindful yoga to the menu of promising CIs to promote educators' stress management and wellbeing and demonstrates that a brief practice format can be feasible and impactful.

Limitations and Future Directions

Although the sample size was adequate to test efficacy, it was relatively small and homogenous in terms of race and SES and confined to only two schools in a relatively advantaged district. Intervention assignment was by school, rather than by individuals, both to protect against contamination effects as well as follow our logic model, which conceptualized whole-building supports for wellbeing. While including a control group was a strength in the study, the two-school design limits generalizability, poses a violation of the ANCOVA assumption of the independence of groups, and does not allow for the use of multi-level modeling to account for the nesting of teachers in schools. In addition, this study used a waitlist control rather than an active control condition. In order to investigate "specific effects," control groups should be considered that account for elements such as physical activity, relaxation, or group interaction. Replications should also include measures of additional aspects of the logic model, including educators' classroom performance, perceptions of school climate, and relationships. Future studies should also investigate the intervention in more diverse urban settings where educators' stressors may be greater or qualitatively different. Because of the great need for effective ways to offset the growing problem of educator stress and burnout, further investigation is warranted to better understand the potential of school-based contemplative interventions to create a positive impact on educator health, school climate, and school performance.

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