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Compassion Meditation to Improve Psychological Well-being Among Volunteer Collegiate Emergency Medical Technicians

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ABSTRACT

Background: Student volunteer EMTs in collegiate-based emergency medical services (CBEMS) agencies deliver life-saving care under significant physical and psychological stress. Their dual status as students and EMTs places them at risk for psychological distress. **Objectives:** CBCT (Cognitively-Based Compassion Training), an evidence-based analytical meditation intervention that combines attention stabilization with compassion cultivation, is a potential effective and safe intervention. **Methods:** This randomized; waitlist-controlled longitudinal pilot study investigated CBCT's potential to improve CBEMS provider well-being. Semi-structured interviews (n=5) and short recorded audio prompts (n=13) were conducted to elucidate agency level and interpersonal factors and resiliency. EMTs were randomized to CBCT (n=8) or waitlist (n=17). Feasibility, acceptability, and perceived benefit were examined. Participants completed self-report measures of burnout, compassion satisfaction, secondary traumatic stress, perceived stress, and compassion malleability pre- and post-CBCT. **Results:** Participants discussed excessive rumination, difficulty transitioning between school and work, and empathic entanglements from treating peers. We found participants randomized to CBCT reported a significant increase in compassion malleability (p=.003), as well a strong trend towards reduced burnout (p=.05). **Conclusion:** This mixed-methods study indicates that CBCT is effective in improving well-being among CBEMS providers and yields insights into improving conditions for other providers and patients.

Keywords: collegiate-based emergency medical services, meditation, psychological well-being

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On many campuses across North America, collegiate-based emergency medical services (CBEMS) organizations provide emergent prehospital care to their communities. CBEMS agencies typically involve staffing by student volunteers, with oversight from campus health systems, campus safety departments, or student government bodies.[1] CBEMS organizations evolved greatly in the last twenty-five years, with new organizations established every year.[2] CBEMS agency capacities differ by agency, with some providing only first responder care, while others own and operate multiple transport vehicles.[1] Providers in these organizations range from those certified as a Basic EMT to Advanced EMT to the Paramedic level. CBEMS agencies also typically take part in standby operations for special events and gatherings on campus, as well as community outreach safety events.

Although approximately 90% of four-year public and private colleges rely on jurisdictional EMS agencies via local 9-1-1,[3] CBEMS programs have proliferated,[1] with growth due in part to several advantages that these agencies afford. First, college campuses are wide-ranging communities, filled with thousands of students, faculty, staff, and visitors of all ages, and campus safety and preparedness organizations must devise robust measures to ensure safe practices and preventative measures. CBEMS organizations provide advantageous complementary capabilities, such as rapid response times, easy integration into campus gatherings and events, and learning opportunities for students.[1] Providers also often have a heightened understanding of campus intricacies and layouts, resulting in a more efficient response.

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Furthermore, CBEMS providers have the distinct ability to offer peer-to-peer support and to establish a strong foundation in the subsequent chain of medical care.[4] This can be advantageous in mental health crises, as students may feel more comfortable speaking with a CBEMS provider as opposed to a local non-campus EMS provider.[5]

Despite the growth of CBEMS on college campuses and the vital role they play in acute care, very little research has examined the well-being and mental health needs of student CBEMS volunteers. However, there are several lines of existing research to indicate that student CBEMS volunteers are at risk for mental health concerns. First, EMTs typically face significant physical and psychological stressors and frequent exposure to traumatic events, but often have little to no time for reflection or closure CBEMS providers must additionally balance this already grueling profession with the demands and rigor of a college education. Their dual status as both college students and EMS personnel may place them at greater risk for psychological distress. In addition, CBEMS providers face the added affective component of responding within their own community and for their peers. A national survey of 474 CBEMS providers showed 32% self-reported depression and 20% reported thoughts of self-harm.[7] In comparison, the prevalence of depression in college students as a whole reported by studies with varied methodology ranges from 7% to 17%. [7] Additionally, 33% reported not feeling comfortable with seeking help for themselves. [7] In systems where mental health services are available, less than 40% of individuals from the general population that experience mental health symptoms seek help.[8] This rate is expected to be even lower among first responders because of a culture of strength and self-reliance.[9] Furthermore, maladaptive coping techniques, such as emotional distancing, gallows humor, and repression have been observed among single-status EMTs (non-college student).[6] These studies taken together demonstrate that CBEMS providers may be at high risk for the development of mental health disorders compared to their non-provider peers and may have unique support needs to bolster resilience and well-being. Yet, direct correlations between dual-status CBEMS providers and single-status college student counterparts is difficult due to limits in scope of CBEMS provider surveys.[7]

Although research on the mental health of CBEMS providers is sparse, there is extensive research documenting the mental and occupational health symptoms experienced by those in helping professions who are exposed to high stress and suffering of others. Routine exposure to high acuity, critical incidents can take a significant toll on providers' well-being, placing them at high risk for psychological factors such as burnout, secondary traumatic stress, and compassion fatigue. High workload, systematic frustration, and exhaustion can lead to burnout.[10] In addition to burnout, secondary traumatic stress (STS) can arise when the act of witnessing and helping others through their trauma causes a unique kind of psychological distress for the helpers.[11] STS refers to the psychological symptoms gained through exposure to another individual suffering a certain trauma or extreme stress.[12] In addition, empathic entanglements – the synchronization of emotional states between people--, may be more common in CBEMS populations due to their peer-to-peer nature. This in turn may place providers at risk for compassion fatigue , a state in which one has exhausted their capacity to care for another.[13] The concept of compassion fatigue has gained traction in the last two decades, though some argue that there is more research needed into how compassion presents in health care to generate a more evidence-based patient-informed definition of both compassion and compassion fatigue.[14]

To address the vital need for evidence-based approaches to mitigate stress and bolster resilience among CBEMS providers, this study introduces and evaluates the feasibility, perceived benefit, and efficacy of a compassion-based meditation protocol in a CBEMS agency at a mid-sized Southern liberal arts research university. Cognitively Based Compassion Training (CBCT) is based on Indo-Tibetan Buddhist *lojong*, or mind training, practices and was adapted to be accessible to those of any or no faith tradition.[15] Previous studies have found that CBCT practice leads to a reduction in stress and lower cortical levels, decreased inflammatory response, and increased adaptability to cortical surges from social stress among college students.[16] CBCT has also been associated with decreased depression and greater empathic accuracy and has been employed for diverse groups, from breast cancer survivors that reported lower depression and increased psychological functioning, to fostered adolescents that showed increased hopefulness, to increased self-compassion in a population of African American suicide attempters.[17–19,19–22]

Toward the ultimate goal of addressing the mental health needs of CBEMS volunteers, we used a mixed-method approach to address several aims: (1) to characterize the specific needs of the population, given there is limited research on CBEMS organizations: (2) to evaluate the feasibility, acceptability, credibility, and expectancy of CBCT for college student EMTs; and (3) to examine the effectiveness of CBCT for improving participant psychosocial well-being.

Methods

Design:

This pilot randomized; waitlist-controlled longitudinal pilot study investigated how CBCT may improve psychological well-being among volunteer collegiate EMTs. Initially, semi-structured interviews (n=5) were conducted with a subset of participants prior to randomization to elucidate the prehospital environment and agency level factors exacerbating stress and bolstering resilience. Participants also responded to short open-ended prompts (n=13) about their interactions with patients and inter and intra-agency providers. Audio responses were transcribed verbatim and analyzed using thematic coding. Next, CBEMS providers were randomized to either receive CBCT training or be placed on a waitlist. CBEMS providers (N=25) completed self-report measures of burnout, compassion satisfaction, secondary trauma stress, perceived stress, and compassion malleability

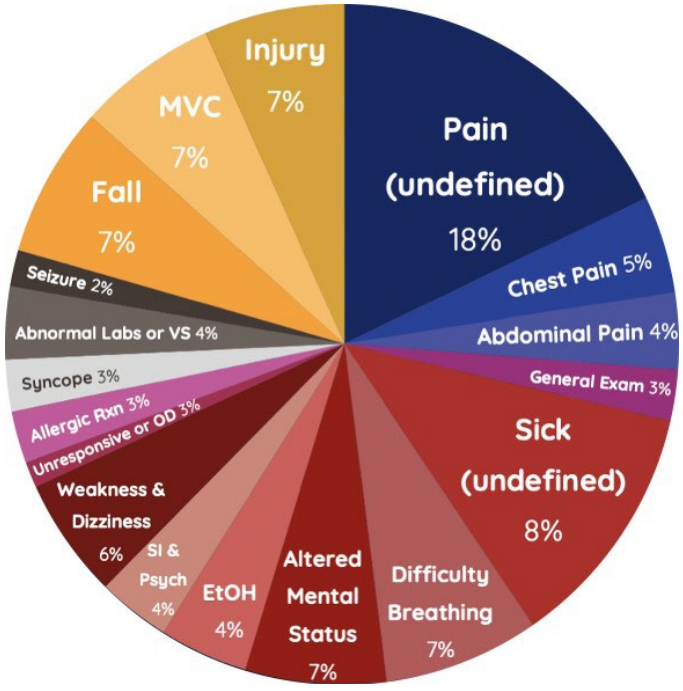
(described below). All study participants completed self-report measures prior to (Time 1) and within two weeks after completion of CBCT (Time 2). EMTs randomized to CBCT also completed post-CBCT self-report measures about perceived benefit and adherence to practice.

Sample and Setting:

Following approval from the Emory University Institutional Review Board, participants were recruited from a CBEMS agency. All CBEMS providers at our institution were eligible. Participants were recruited via email and posted flyers. All participants were active EMT providers with the CBEMS agency, were 18 years of age or older, and all provided informed consent to participation. There were no exclusion criteria. Participants received a $10 gift card for completing each assessment (up to $30 total).

Emory Emergency Medical Services (EEMS) is a volunteer CBEMS organization, operated by students, with oversight from Emory's Office of Critical Event Preparedness and Response. The agency, established in 1992, provides emergency medical care to Emory University students, faculty, staff, visitors, and the surrounding community. Previous agency call history includes anaphylaxis, drug overdose, cardiac arrest, motor vehicle collisions, behavioral health crises, and more (see Figure 1). EEMS also works standby for several large events such as concerts, marathons, and ceremonies on campus, as well as in the greater city. In addition, EEMS offers educational workshops, such as bystander CPR training. Internal data from EEMS reports from the year the intervention was offered showed that 30% of the agencies calls occurred on campus, 33% at a nearby senior living center, and 35% off campus. In addition, 28% of calls involved young adults, 29% adult, 38% geriatric, and 4% pediatric cases.

Figure 1: Emory EMS Call History Fall 2023
Internal data from Emory EMS shows call distribution by patient chief complaint in Fall 2023



Randomization and Blinding:

EEMS EMTs were randomized to receive CBCT or to a wait-list comparison group using the RANBETWEEN function in Excel, so that roughly equal numbers of providers were in each group. Eligible participants randomized to CBCT were then contacted, and individuals were taken off the waitlist in random order and invited to CBCT one by one, if spots opened. An a priori power analysis was not done, all CBEMS providers were recruited for this pilot study. Study participants were blind to group assignments at Time point 1. Research personnel were also blinded during all data collection and analysis. The CBCT group included 8 participants, and the waitlist group had 17 participants.

Cognitively Based Compassion Training Course Delivery:

CBCT is composed of a foundational practice and six integrative modules that build upon each other to promote resilience, compassion, and well-being.[15] Each module also incorporates a meditation exercise, known in CBCT as a "contemplative practice," as the primary training approach.[15] The practices and exercises employed in CBCT are regarded as "cognitive" or "analytical" meditation – which refer to a process of arriving at personal insights through mental investigation.[15] This differs from practices that primarily focus on somatic experiences of compassion -- such as heart warmth, tingles, or other caring sensations.[23] CBCT instead uses cognitive reappraisals and mental retraining to restructure perspectives and actively cultivate traits such as empathy, impartiality, and compassion.[23]

CBCT is traditionally taught once a week over the course of 8 weeks. For this study, we tested a novel 4-session abridged online version of this training that, in terms of time commitment, was thought to be more feasible for these providers. CBCT courses were taught by two trained and experienced CBCT instructors. CBCT instructor training consists of a 1-week retreat and workshop, 8-week seminar, and 10-week supervised teaching session. Participants in this study met once a week on Zoom for 75 minutes.

Qualitative Measures:

Semi-structured interviews

All study participants were invited to participate in semi-structured interviews about their experiences in EMS and with the chosen CBEMS agency prior to randomization. Participants indicated interest in being selected for an interview. Participants were randomized and selected till saturation. Participants were interviewed one-on-one on Zoom during a time convenient for them. Interviews lasted 15-20 minutes and were conducted by

a trained research facilitator using a semi-structured interview guide. Interviews were done prior to randomization to evaluate the EMS environment and factors contributing to stress and/or resilience. Participants were asked about their thoughts on the EMS agency, existing support avenues, and how they balance EMS with their college education. Each interview was audio-recorded and transcribed verbatim. Transcripts were also anonymized and cleaned. A codebook was developed of overlapping and emergent themes. All interview transcripts were coded in MAXQDA and queried by two independent coders.

Recorded Prompts

All participants were also asked to answer questions regarding their experiences with patients and inter- and intra-agency providers at Time 1. Participants were asked to record their answers on Qualtrics online platform. Recordings were stored within Phonic ai (https://www.phonic.ai/) platform and transcribed verbatim. An inductive codebook was developed to thematically code the transcripts. Transcripts were coded by two independent coders with discrepancies resolved by a third independent coder.

Quantitative Measures:

Self-Report

Quantitative self-report measures were completed by participants at both Time 1 and Time 2 using Qualtrics online platform. Pre-randomization all participants completed the meditation background survey (5-item questionnaire that examines participants background in meditative practices and views on it) and Interest in CBCT survey (6-items using Likert scale to assess interest in CBCT). At both time points all participants completed the compassion malleability beliefs scale (8-items using Likert scale from 1-7 to measure belief in malleability compassion with higher scores indicate greater belief that compassion is a malleable skill that one can develop over time),[24,25] the Professional Quality of Life version 5 (ProQOL) scale (a 30-item inventory that addresses compassion satisfaction, burnout, and compassion fatigue),[11] and the Perceived Stress Scale – 4(PSS-4) (a four-item scale measuring the degree to which situations in one's life are considered stressful).[26,27] At time 2, post completion, the CBCT group completed the Intervention Credibility and Expectancy Questionnaire (15-item questionnaire exploring the perceived benefit, applicability, and feasibility of CBCT).[28]

Statistical Analysis

Quantitative analyses were conducted using Statistical Package for the Social Sciences (SPSS) software (version 29.0 for Mac, SPSS, Inc., Chicago, IL, United States) and Statistical Analysis System (SAS). Normality was evaluated using the Shapiro-Wilk test. Descriptive statistics were evaluated in SPSS. Paired and independent t-tests assessed the differences between time points for each group. Effect size was evaluated with Cohen's d point estimates of effect sizes. Analysis of variance (ANOVA) using PROC MIXED was done in SAS to evaluate group-by-time interactions. PROC MIXED was selected for its ability to use all available data to model correlation structure between measurements and because PROC MIXED has been shown to be a more conservative approach compared to other analysis techniques for repeated measures analysis.*29* For any variable demonstrating a significant group-by-time interaction, we examined whether changes in that variable were correlated with CBCT practice time using spearman's rho correlation analyses.

Results

The social and demographic characteristics of participants in the trial (N=25) are presented in Table 1. The average participant age was 20.8 (SD= 0.94). Most participants identified as women (64%), 32% as men, and 4% as non-binary. Experience in the health care field ranged from less than a year to 4 years. Around a third of participants (32%) identified as White, 4% as Black or African American, 60% as Asian, and 4% as other. Chi-squared analysis showed that there was no significant difference between CBCT and waitlist group demographic criteria.

All participants were asked about their level of interest in learning CBCT prior to randomization. Eighty percent of participants agreed that they were interested in learning CBCT to improve their work with patients, 76% agreed that they were interested in improving their mental health, 60% agreed that they were interested in learning to improve their physical health, 76% agreed that they were interested in learning to improve their personal relationships, 68% agreed that they were interested in learning to help manage their stress, and 76% agree that they were overall

Table 1: Sociodemographic Characteristics
Sociodemographic data of participants by full sample, treatment group, and wait-list group reported

Baseline characteristic	Full Sample	Treatment	Wait-list
Gender			
Woman	16(64%)	4(50%)	12(70.6%)
Man	8(32%)	3(37.55)	5(29.4%)
Non-binary	1(4%)	1(12.55)	0(0%)
Sex			
Male	8(32%)	3(37.5%)	5(29.4%)
Female	17(68%)	5(62.5%)	12(70.65)
Age			
18	1(4%)	1(12.5%)	0(%)
19	1(4%)	0(0%)	1(5.9)
20	5(20%)	1(12.5%)	4(23.5%)
21	13(52%)	3(37.5%)	10(58.8%)
22	5(20%)	3(37.5%)	2(11.8%)
Years in Healthcare			
Less than a year	1(4%)	0(0%)	1(5.9%)
1	7(28%)	2(25%)	5(29.4%)
1.5	3(12%)	1(12.5%)	2(11.8%)
2	9(36%)	4(50%)	5(29.4%)
3	4(16%)	1(12.5%)	3(17.6%)
4	1(4%)	0(0%)	1(5.9%)
Race			
White	8(32%)	3(37.5%)	5(29.4%)
Black or African American	1(4%)	0(0%)	1(5.9%)
Asian	15(60%)	5(62.5%)	10(58.8%)
Other	1(4%)	0(0%)	1(5.9%)
Hispanic or Latino			
Yes	1 (4%)	1(12.5%)	0(0%)
No	24(96%)	7(87.5%)	17(100%)

very interested in learning CBCT.

Both the semi-structured interviews and short recorded audio prompts highlighted key aspects in the EMS environment related to students' stress and resilience. Semi-structured interviews focused on agency and position level factors contributing to stress and resilience. Representative codes and counts from key themes that emerged in the semi-structured interviews are shown in Supplemental Table 1. Key themes included systemic issues, lack of control, difficulty treating peers, transitioning between school and work, and avenues for improvement. One quote from these interviews really highlights challenges CBEMS providers face:

> One call that I had difficulty processing came out as a cardiac arrest for an Emory student. The student was dead on arrival...the patient's mother had called the ambulance, and it was very hard to watch the family realize their son had died. And then also know that we were the ones who had to tell them this. Fortunately, my supervisor was on scene but after that call um I remember we had an extended debriefing with not only the supervisor on shift but also the director of EEMS and with the entire crew that was involved...a call that's like this obviously has you thinking about things after the shift and it kind of shocks you. This call it wasn't my first DOA, but it was my first DOA where I had to see the family um go through the initial stages of shock and grieving.

This quote portrays challenges that are relatively unique to CBEMS volunteers that other EMTs may not commonly encounter. Participants also noted potential stressors such as working amidst systemic issues in a system that "is just so broken", not following continuity of patients and being unaware of patient outcomes, having trouble transitioning between their roles as an EMT on campus and as a student on campus, and challenges of balancing rigorous coursework with long, busy shifts. Participants noted that they would like to see more avenues for supporting their well-being from the agency level:

> Sometimes I do feel like there's not the best support in terms of difficult calls. It's gotten better this past year, but when I first joined, there wasn't that much conversation when difficult calls came up and support outside of working. I think a little bit of it is the culture. There's a lot of students just who are pre-med in general, who I just don't think are as affected by seeing some things that would be difficult for others.

Participants also described positive aspects of their profession and the agency that could be potential points of resilience. They noted helping patients and their community, pre-professional interests, diverse exposure to different kinds of patients, environments, and situations, connecting with patients in a deeper sense, as well as the friendship and strong sense of community and similarity they find in their agency. They also noted unique advantages such as being able to better connect with their patient population due to their status as a CBEMS agency. Short, recorded audio prompts focused on individual connections that were associated with student stress and resilience. Representative codes and count from select themes that emerged in the short, recorded audio prompts are shown in Supplemental Table 2. Participants here likewise expressed factors that are potential stressors such as emotional trauma from treating peers and maladaptive coping mechanisms such as avoidance. Participants also noted challenging patients that made it difficult to care for them both physically and emotionally. Participants described challenges with other providers from within the agency and from other agencies from differences in opinions on care practices. Some participants also described the effect of high stress on their ability to provide optimal care:

> I feel like all my all my training, my ABCs and everything flew out the window as I wanted to give definitive care because I could tell that she was in stress, and I wanted to like help her and like make it better.

Points of resilience were also evident in participants' interpersonal connections. Helping others and forming deeper patient interactions were key aspects potentially promoting their resilience. One participant described one connection with a patient:

> It was clear that she just kind of needed someone to be there for her. I remember at one point she reached out and grabbed my hand and like held my hand and that was really adorable because it was a really nonclinical way that I could like you know, be there for her. And I just remember feeling so good that I was able to answer her questions and be the person that she could look up to and know she was safe with.

Overall participants also expressed introspective behavior, often advocated for more compassionate behavior, and were deeply motivated towards improvement.

In terms of CBCT acceptability, participants who were randomized to CBCT were asked about the perceived benefits of the meditation intervention. All of the participants (100%) reported that they felt more encouraged to be compassionate with themselves. All participants (100%) also felt that as a result of CBCT they were encouraged to be compassionate with their teams. 86% felt they learned more about their team members and 57% reported that they felt more connected to their team members as a result of CBCT training. Participants were also asked specific questions regarding the credibility and expectancy of CBCT. 86% felt that CBCT was able to reduce burnout and other negative feelings, 86% would recommend it to a friend, 86% felt CBCT improved well-being generally, and 72% felt more connected to others and less burned out. 86% felt the program was logical. Since this course was delivered in a novel online format, participants were also asked how they felt about the delivery. 29% of participants reported they would have preferred to meet in person and 57% of participants reported they preferred online. The course appeared to be feasible

for participants, given their attendance and meditation practice frequency. 85% of participants attended all or missed only one session total. 100% of participants reported practicing meditation outside of sessions.

Lastly, the efficacy of CBCT to improve specific psychosocial parameters was evaluated. Shapiro tests indicated that the difference in self-report measures from time 2 to time 1 did not show evidence of non-normality. Independent samples t-tests indicated that there was no significant difference in means between the waitlist group and CBCT group at Time 1, indicating that randomization was successful.

Paired t-tests revealed a main effect of time within the CBCT group for compassion malleability (t (17) =2.58, p<.05 and a strong trend towards significance for burnout (t (17) =2.65, p=.05) (see Table 2). Specifically, there was a significant increase in compassion malleability and decrease in burnout. Paired t-tests also showed a main effect of time within the wait-list group for compassion malleability (t=2.44, p=.03) and PSS stress (t=3.14, p=.01). Effect sizes of paired and independent t-tests are reported in Table 2. Repeated Measures ANOVA using PROC MIXED revealed significant group-by-time interactions for compassion malleability (F=15.13, p<.001). There were no significant group-by-time interactions for compassion satisfaction, burnout, secondary traumatic stress, or stress. The observed reduction in burnout was also associated with CBCT practice. Correlation coefficients from spearman's rho correlation analysis also indicated that participants with greater practice time, across both the treatment and waitlist groups, were associated with lower burnout (r (23) = -.86; p<.05).

Discussion

This mixed-methods, interdisciplinary pilot study investigated stressors and points of resilience experienced by CBEMS providers, as well as feasibility, acceptability, and efficacy of CBCT in promoting psychosocial well-being. Overall, we found that participants randomized to CBCT had an increase in compassion malleability and reduction in burnout. We also found that this reduction in burnout was associated with CBCT practice time.

Given that this was a pilot study, we investigated participants' perceptions of the benefits of CBCT. Specifically, participants were queried regarding feasibility, acceptability, credibility, and expectancy. Interestingly, participants showed greatest interest in CBCT for helping their patients. This level was even higher than their interest in CBCT for their own benefit, highlighting their character. Participants overall had high interest in learning CBCT at the outset of the study and reported after the course that CBCT reduced burnout and other negative feelings, improved well-being generally, was logical, and that they would recommend CBCT to a friend. 100% of participants also reported that as a result of CBCT they felt more encouraged to be compassionate with themselves and their team members, indicating that they thought CBCT was beneficial and feasible. Since this course was delivered in a novel virtual format, participants were also asked about their thoughts on it. Participants had varying opinions on the delivery format, which may indicate that offering both in-person and online options may be important to meet everyone's needs.

Semi-structured interviews and short recorded audio prompts provided insight into the nature of CBEMS EMTs and highlighted ways in which CBCT could apply. Semi-structured interviews revealed agency and role level stressors and points of resilience. Specifically, helping patients and community, pre-professional interests, agency support, and collegiate EMS advantages were some aspects of resilience seen unique to these agencies. Interviews also revealed stressors at this level, emerging from systemic issues, absence of patient continuity, difficulty treating peers, challenges transitioning between school and work, and changes needed to agency education and practice. The short, recorded audio prompts further revealed stressors and points of resilience at the interpersonal level meaning having to do with their patients or other providers. Here we see points of resilience such as introspection and examining one's actions and responses, motivation to improve, helping others, and deeper patient interactions. Yet, we also see emotional trauma, mistake making, and difficulties with inter and intra- agency providers.

Table 2: Self Report Survey Measures Effect of Group and Time

Table reports treatment group time 1 and time 2 means with standard deviation. Paired t-test for treatment group displays effect of time on outcome. Findings from the wait-list group are also displayed. Post-treatment (Time 2) independent t-test displays the effect of group on outcome. PROC MIXED group-by-time interaction also reported

	Treatment Group					Wait-List Group					Post-treatment t-test			Interaction	
Outcome Variable	**Time 1**	**Time 2**	**t**	**p**	**d**	**Time 1**	**Time 2**	**t**	**p**	**d**	**t**	**p**	**d**	**F**	**p**
ProQOL compassion satisfaction	39.5(4.2)	40.8(4.9)	-0.93	.39	-.38	39.6(6.7)	38.9(7.0)	0.53	.61	.17	.83	.42	.40	1.42	.24
ProQOL burnout	**24.2(3.9)**	**20.8(5.4)**	**2.65**	**.05#**	**1.1**	23.0(4.2)	22.7(4.6)	0.30	.77	.10	-.60	.56	-.30	3.62	.07
ProQOL secondary trauma stress	23.5(3.1)	20.3(4.1)	1.86	.12	.76	23.5(6.4)	21.9(4.2)	1.42	.19	.45	-.70	.50	-.34	1.03	.32
Compassion malleability	**40.1(4.5)**	**45.1(5.8)**	**-2.58**	**.04***	**-.97**	**42.1(3.7)**	**38.7(4.2)**	**2.44**	**.03***	**.77**	**2.7**	**.02** *	**1.3**	**15.13**	**<.001****
PSS Stress	7.3(3.0)	5.0(3.3)	1.94	.11	.79	**7.7(2.2)**	**5.9(2.3)**	**3.14**	**.01***	**.99**	-.70	.50	-.34	0.02	.88

#p = .05, *p < .05, **p < .001

Participant responses also illuminated potential beginnings of burnout, reduced interest in work, compassion fatigue, stress, and more that could become larger issues over time if not acted upon. Providers recounted calls that were emotionally traumatic, describing how they often fixated on scenarios and got "flashbacks" from high stress events. They also pointed out occasions when challenging providers, patients, and scenarios resulted in them or their peers not performing optimally. Reflections that emerged in the qualitative interviews also helped with interpreting the reduction in compassion malleability seen in the control group. Persistent exposure to these stressors without avenues for well-being could further lower compassion malleability. Semi-structured interviews and short recorded audio prompts along with self-report data provided a holistic understanding of this unique, understudied population, and support the idea that interventions to improve resilience will be important to entrain the resilience necessary with such a stressful role.

In fact, the data from this study indicates that CBCT is effective for entraining such resilience. Participants randomized to CBCT reported significant increases in their belief in compassion malleability. This is consistent with other studies that found CBCT increases compassion malleability in hospital chaplains.[25] Compassion malleability is the belief that compassion can be trained or altered and is directly related to wellbeing.

Furthermore, the compassion malleability scale used in this work was developed based on an existing scale to measure the malleability of empathy.[20,24] Research by other groups found that beliefs about the malleability of empathy predicted empathy and empathic behavior, especially in conditions when one's empathy is challenged.[24] Studies that examined this empathic malleability scale found that those with a more malleable belief worked harder to improve their empathic accuracy as determined by the Reading the Mind in the Eyes task.[24] Their belief in empathy influenced their motivation to grow, linking to the greater theoretical framework connecting growth mindsets with positive psychological outcomes.[30,31] Studies looking at other compassion training interventions had similar findings: that motivation, commitment, and action were essential for effectiveness.[32]

As described earlier, single-status EMTs alone face significant stressors, with 4 out 5 EMTs reporting being overwhelmed/deeply disturbed from an incident, and 48.3% of EMTs experiencing some form of burnout.[6,33] College students similarly experience unique stressors, with the prevalence of depression in college students ranging from 7% to 17%.[7] It is also well documented that college students are in a transitional state in their lives and that young adulthood marks the period when many mental health problems arise34. Early career also marks a key time where healthcare workers may be highly susceptible to burnout and stress.[35] Thus, CBCT training may be a particularly effective approach for bolstering the well-being of CBEMS providers, given their dual status.

This increase in compassion malleability may arise from several aspects of CBCT. CBCT instruction includes content on the definition and nature of compassion, discussing that it can be boundless. It also reinforces the idea that warm-heartedness can be cultivated and extended, even in challenging situations. CBCT builds on interconnectedness and one's relation to others and oneself, ideas that can be traced to the lojong tradition in Indo-Tibetan Buddhism. Lojong means "thought transformation" or "mind training" and is a systematic way of reversing thoughts, emotions, and behaviors that are maladaptive, and for altering them to thoughts, emotions, and behaviors that are beneficial to oneself and others.[23] Geshe Thupten Jinpa explains: that "the salient idea of transformation, whereby a process of training, habituation, cultivation, and cleansing induces a profound transformation—a kind of metanoesis—from the ordinary deluded state, whose modus operandi is self-centeredness, to a fundamentally changed perspective of enlightened other-centeredness."[36] This change in mindset is the difference between CBCT and other non-analytical mindfulness programs that may instead focus on lovingkindness (metta) meditation.[23] CBCT incorporates concepts such as interdependence and gratitude to garner connectedness and equality, which can develop into a strong sentiment of love and compassion for others.[23]

Finally, we observed a strong trend indicating that participants randomized to CBCT reported decreased burnout compared to those in the waitlist. This indicates that CBCT may be effective in improving the psychosocial well-being of CBEMS providers. The significant association of changes in burnout with CBCT practice lends further support for the effectiveness of CBCT for improving burnout symptoms.

Limitations

One significant limitation of this study was the small sample size and difference in size between the control and waitlist groups. Groups were randomized, and then participants were taken off the waitlist if individuals from the CBCT group were unable to attend. This may have created a discrepancy in the interest levels, workload, and stressors. Another limitation may have been the difficulty isolating stressors arising from the EMT provider status and those from being a college student. This, however, could be corrected by noting the equivalent wait-list control group. Moving forward, further research and implementation efforts are warranted to fully integrate CBCT and similar interventions into CBEMS organizations, thereby providing vital support to these dedicated individuals, as they navigate the challenges of balancing their multifaceted roles as college students and emergency responders.

Conclusion

CBCT training was found to significantly increase CBEMS EMT compassion malleability compared to those EMTs that continued normal service. CBCT was also found to result in a strong trending decrease in burnout. This trend was also significantly associated with greater CBCT practice time. This

study also thoroughly investigated stressors and points of resilience in the CBEMS environment using interdisciplinary methodology that serves as a basis for future work. Overall CBCT was found to be effective and feasible for CBEMS providers.

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Authorship Statement

SS, JSM, and AE conceived and designed the study. SS, JSM, and EB collected the data. SS, JSM, EB, AND IV analyzed the data. SS and JSM drafted the manuscript. All authors contributed to the revision of the manuscript. SS takes responsibility for the paper as a whole.

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Supplementary Materials (Available Online)

Table 1: Semi-Structured Interview Code Table

Table 2: Short Recorded Audio Prompt Code Table

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