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Practical resiliency training for healthcare workers during COVID-19: results from a randomised controlled trial testing the Community Resiliency Model for well-being support

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ABSTRACT

Objective To introduce the Community Resiliency Model (CRM) as mental well-being support for healthcare workers working through the height of the COVID-19 pandemic.

Design Randomised controlled trial with a no treatment control group.

Setting Two large urban health systems in the Southern United States between October 2020 and June 2021.

Participants Eligible participants were currently employed as healthcare workers within the participating healthcare systems. 275 employees registered and consented electronically in response to email invitations. 253 participants completed the baseline survey necessary to be randomised and included in analyses.

Intervention Participants were assigned 1:1 to the control or intervention group at the time of registration. Intervention participants were then invited to 1-hour virtual CRM class teaching skills to increase somatic awareness in the context of self and other care.

Main outcome measures Self-reported data were collected rating somatic awareness, well-being, symptoms of stress, work engagement and interprofessional teamwork.

Results Baseline data on the total sample of 275 (53% nurses) revealed higher symptoms of stress and lower well-being than the general population. The intervention participants who attended a CRM class (56) provided follow-up survey data at 1 week (44) and 3 months (36). Significant improvement for the intervention group at 3 months was reported for the well-being measures (WHO-5, $p<0.0087$, $d=0.66$; Warwick-Edinburgh Mental Well-Being Scale, $p<0.0004$, $d=0.66$), teamwork measure ($p\leq0.0002$, $d=0.41$) and stress (Secondary Traumatic Stress Scale, $p=0.0058$, $d=46$).

Conclusion Baseline results indicate mental health is a concern for healthcare workers. Post intervention findings suggest that CRM is a practical approach to support well-being for healthcare workers during a crisis such as this pandemic. The simple tools that comprise the model can serve as a starting point for or complement self-care strategies to enhance individual resilience and buffer the effects of working in an increasingly stressful work environment.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Little is known about how to support healthcare workers during a pandemic. Prior to COVID-19, a need for more studies on front-line healthcare workers during disease outbreaks and higher quality evidence for interventions to build resilience and mental health was identified. One prepandemic study tested a Community Resiliency Model training for a group of nurses with promising results; the nurses showed significant improvement in several well-being measures compared with nurses who were randomly assigned to a nutrition training.

WHAT THIS STUDY ADDS

⇒ This randomised controlled trial measures the effect of an intervention on front-line healthcare workers during a pandemic. The findings from this study contribute to a growing evidence base demonstrating the Community Resiliency Model is an effective self-care strategy for healthcare workers.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Resilience and mental health needs for healthcare workers will not be short term. The Community Resiliency Model offers a set of accessible and easy-to-learn skills for individuals to use in the face of adversity. This intervention can be part of a larger organisational strategy to support employee well-being and protect staff from burn-out during COVID-19 and beyond.

INTRODUCTION

Attention to stressful working conditions in healthcare predates the current SARS-CoV-2 (COVID-19) pandemic. In Fall 2019, a National Academies Press report recommended a systems approach to address the controllable factors relating to job demands and job resources to reduce clinician burn-out, which is known to interfere with patient-centred and high-quality care.[1] As

the pandemic conditions persist, concern for burn-out among healthcare workers (HCW) has been complicated by unprecedented, complex patient care and heavier workloads due to the resource constraints of staffing shortages, training needs and supply chain problems. The emotional toll of the pandemic on HCWs is already documented; mental health sequelae include depression, anxiety, post-traumatic stress disorder (PTSD) and decreased well-being overall.[2–8] Impaired mental well-being, loss of job satisfaction, burn-out and the intent to leave one's position are all associated and these are costly consequences that affect the ability to deliver safe, quality patient care.[9–13] One COVID-era study identified a worrisome 50% career change ideation in a sample of over 1000 HCWs[14] and Elsevier's Clinician of the Future Report estimates a mass exodus: 75% of HCWs will leave their jobs by 2025.[15]

Despite the negative effects of workplace pressure both personally and professionally, little evidence exists to guide support for individual HCW mental health and resiliency. Prior to COVID-19, supportive interventions during disease outbreaks and epidemics were reviewed and found to be understudied and inconclusive.[16] The 2019 'System's Model of Clinician Burnout and Professional Well-Being' posits that individual characteristics mediate the effect of a stressful work environment.[1] Thus, investing in interventions to support HCW resilience at the individual level is warranted.

The Community Resiliency Model (CRM) is a promising, research-informed intervention for front-line, public safety and essential workers.[17 18] Prior to the pandemic, the model was tested using a randomised controlled design against a nutrition intervention with 77 nurses at a large urban hospital. After exposure to a 3-hour CRM training, moderate to large effect sizes were demonstrated for improved well-being, resiliency, secondary traumatic stress (STS) and somatic symptoms (SS).[19] Nurses in the study who were taught CRM reported using their new skills on the job to reduce stress, and during 'scary situations with patients' or 'after a traumatic or distressing experience'. CRM is a novel approach to mental wellness self-care. The six easy-to-learn skills bring attention to body sensations in the present moment, which interrupts autonomic responses to stress.[17] CRM's cultivation of body awareness as a means of developing resilience and coping is supported by neuroscience and a burgeoning evidence base.[20–22]

The biological perspective of CRM frames human reactions to stress as normal, helping to destigmatise mental health and behavioural reactions. Individuals can use CRM skills to cope with troubling emotions (eg, frustration, anxiety, anger) by paying attention to external or internal sensations (respectively exteroception and interoception) in their own body; intentional interoceptive awareness is a physical mindfulness, devoid of emotional or cognitive content. For example, when faced with a challenging or anxiety-producing situation at work, an HCW can intentionally touch and notice sensations of the fabric of their uniform, inducing a momentary pause which may deter negative emotional responses. Dysregulated emotions in the workplace interfere with interpersonal relations and rational decision-making. Conversely, practising CRM skills fosters a prosocial mindset and increases one's capacity to manage stress in the moment. The skills are reciprocal providing an exponential benefit at the community level, in this case with coworkers or patients, upholding the delivery of safer quality care.

Purpose

The purpose of this study was to test the effect of a brief, virtual CRM training to support HCW well-being, work engagement and interprofessional teamwork while reducing secondary stress symptoms during the heightened stress of the pandemic. In the present study, HCW includes front-line clinicians and any staff member supporting the work of care providers within a large, urban healthcare setting.

Specific aims

To compare self-reported responses at 1 week and 3 months after a single 1-hour virtual CRM training to a no-treatment group. Measures included:

- Sense of well-being, resiliency and sensory awareness.
- Perceptions of work engagement and interprofessional teamwork.
- SS and STS.

METHODS

The study population included staff (HCWs) from two large, urban healthcare settings (see table 1). The only eligibility requirement was employment at either healthcare system during the time of the study. A convenience sample of 253 volunteers were recruited from 1000 invitees directly by key contacts using intranet email within the health systems. Participants consented after accessing the registration link at the time of study enrolment. As registration was accepted random assignment to the intervention or no intervention control group occurred using Research Electronic Data Capture (REDCap) (see figure 1). The 128 participants randomised to the intervention group were emailed an invitation to attend one of several scheduled 1-hour introductory classes. Fifty-six intervention participants attended a class, taught virtually via the Zoom platform. CRM teachers, all certified by the Trauma Resource Institute in Claremont, California, taught the model and engaged participants through the Zoom chat feature and a synchronous postclass question and answer period. During the class, participants were invited to download an app, 'ichill', for skill reinforcement. Data were collected from participants at three time points: consent, 1 week and 3 months post-training (or after baseline survey if in the control group). Control participants were offered the CRM training when their 3-month survey was completed. Twenty of these participants attended a class but were not included in the study analyses.

Table 1 Demographics and clinical risk characteristics

	Control (n=127)	Intervention (n=126)	Total (n=253)
Demographics			
Age			
Mean (SD)	43.906 (12.358)	43.944 (12.265)	43.925 (12.287)
Range	23.000–71.000	24.000–70.000	23.000–71.000
Years worked in healthcare			
Median (Q1, Q3)	15.000 (6.500, 27.000)	15.000 (7.000, 27.750)	15.000 (7.000, 27.000)
Range	0.000–48.000	0.000–47.000	0.000–48.000
Years in current position			
Median (Q1, Q3)	3.000 (1.750, 7.000)	3.250 (2.000, 8.000)	3.000 (2.000, 7.000)
Range	0.000–38.000	0.000–35.000	0.000–38.000
Gender (%)			
Male/choose not to answer	15 (11.8)	24 (19.0)	39 (15.4)
Female	112 (88.2)	102 (81.0)	214 (84.6)
Type of work (%)			
Outpatient primary care	10 (7.9)	9 (7.1)	19 (7.5)
Outpatient specialty care	20 (15.7)	17 (13.5)	37 (14.6)
Inpatient care	52 (40.9)	50 (39.7)	102 (40.3)
ED	5 (3.9)	13 (10.3)	18 (7.1)
Support services	12 (9.4)	11 (8.7)	23 (9.1)
Administration	15 (11.8)	15 (11.9)	30 (11.9)
Other	13 (10.2)	11 (8.7)	24 (9.5)
Role at work (*not mutually exclusive*) (%)			
Nursing	52 (40.9)	49 (38.9)	101 (39.9)
Administration	15 (11.8)	15 (11.9)	30 (11.9)
Physician	13 (10.2)	13 (10.3)	26 (10.3)
Support services	14 (11.0)	11 (8.7)	25 (9.9)
APRN/PA	11 (8.7)	12 (9.5)	23 (9.1)
Pharmacy	6 (4.7)	8 (6.3)	14 (5.5)
Social services	4 (3.1)	4 (3.2)	8 (3.2)
Technician	3 (2.4)	3 (2.4)	6 (2.4)
Therapists	4 (3.1)	2 (1.6)	6 (2.4)
Rehabilitation	1 (0.8)	1 (0.8)	2 (0.8)
Other	17 (13.4)	15 (11.9)	32 (12.6)
Clinical risk factors			
Significant stressors (*not mutually exclusive*) (%)			
Work	103 (81.1)	98 (77.8)	201 (79.4)
COVID-19 challenges	86 (67.7)	80 (63.5)	166 (65.6)
Emotional	66 (52.0)	69 (54.8)	135 (53.4)
Family	64 (50.4)	63 (50.0)	127 (50.2)
Financial	31 (24.4)	28 (22.2)	59 (23.3)
Illness	18 (14.2)	26 (20.6)	44 (17.4)
Other	9 (7.1)	9 (7.1)	18 (7.1)
WHO<50: poor well-being (%)			

Continued

Table 1 Continued

	Control (n=127)	Intervention (n=126)	Total (n=253)
WHO≥50	64 (50.4)	57 (45.2)	121 (47.8)
WHO<50	63 (49.6)	69 (54.8)	132 (52.2)
WHO<29: risk of clinical depression (%)			
WHO≥29	106 (83.5)	99 (78.6)	205 (81.0)
WHO<29	21 (16.5)	27 (21.4)	48 (19.0)
SSS-8: somatic symptoms (%)			
N-Miss	8	10	18
<4, none to minimal	15 (12.6)	16 (13.8)	31 (13.2)
4 to <8, low	27 (22.7)	26 (22.4)	53 (22.6)
8 to <12, medium	24 (20.2)	25 (21.6)	49 (20.9)
12 to <16, high	25 (21.0)	22 (19.0)	47 (20.0)
≥16, very high	28 (23.5)	27 (23.3)	55 (23.4)
STSS-DSM-5: five categories (%)			
N-Miss	21	21	42
<26, little to none	10 (9.4)	2 (1.9)	12 (5.7)
26–33, mild	12 (11.3)	13 (12.4)	25 (11.8)
34–41, moderate	18 (17.0)	26 (24.8)	44 (20.9)
42–45, high	13 (12.3)	19 (18.1)	32 (15.2)
≥46, severe	53 (50.0)	45 (42.9)	98 (46.4)
At risk for PTSD (from STSS-5 criteria) (%)			
N-Miss	8	8	16
No	82 (68.9)	76 (64.4)	158 (66.7)
Yes	37 (31.1)	42 (35.6)	79 (33.3)

APRN/PA, advanced practice registered nurse/physician assistant; DSM-5, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; ED, emergency department; PTSD, post-traumatic stress disorder; SSS-8, Somatic Symptom Scale-8; STSS, Secondary Traumatic Stress Scale.

Patient and public involvement

Patients were not involved in this study. The participants in this study were front-line HCWs, and HCWs were involved in all aspects of this study. The research question was prompted by early concerns for HCW well-being due to the increased workload, resource limitations and fear of exposure or spread of COVID-19. The study team was comprised of CRM-certified HCWs who were aware that there was limited evidence guiding how to support HCWs during a pandemic, but that CRM had shown promise when tested with HCWs in non-pandemic conditions. The outcome measures were also informed by HCWs representing the participants. Two members of the research team were employed by the participating organisation: one a provider and one a nurse (MB and DL). The Utrecht Work Engagement Scale (UWES) was the measure of choice to evaluate burn-out due to its organisational relevance. A team relations measure was developed to evaluate a change in the conditions for interprofessional collaboration, known to support better patient care and possibly more difficult at this time of increased stress.

The delivery of the intervention was informed by HCW needs. Consideration was made for lower staff morale, the possibility of associated stigma and increased time constraints, all expressed by the participating organisation. A brief, virtual and small group training was provided which allowed participants to interact, ask questions and provide feedback to the study team. Snowball recruitment was encouraged after study registration and control participants were given the opportunity to attend the intervention (training) after study completion (submission of a 3-month survey).

Preliminary findings from this randomised controlled trial were disseminated to the participants and organisation sponsors at the close of the study. These preliminary findings were also shared with the Trauma Resource Institute in California, where CRM was developed, and with the funding entity at the organisation (Woodruff Health Sciences Center). With consideration to the lay

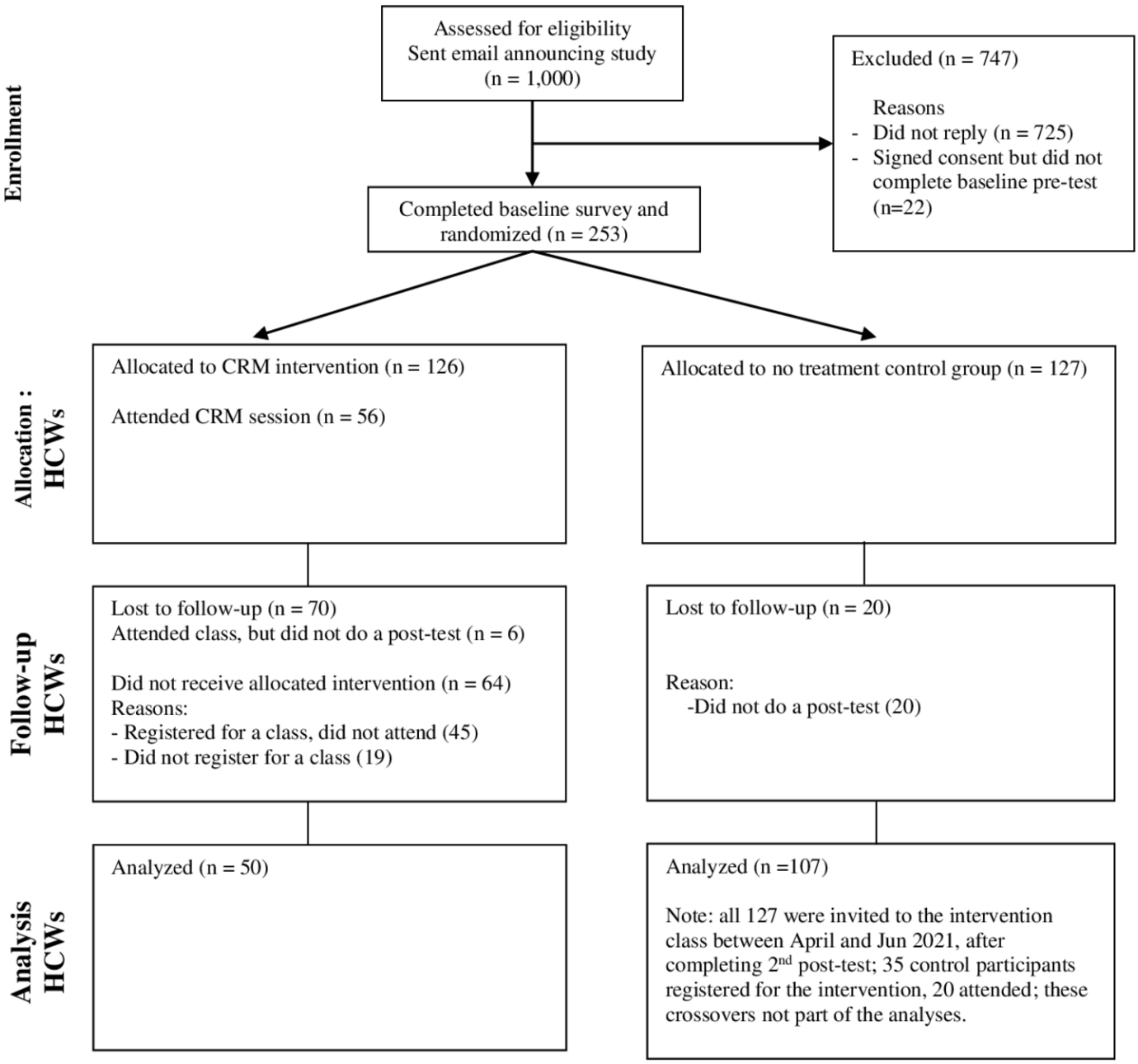

Figure 1 Consolidated Standards of Reporting Trials (CONSORT) flow diagram for randomised controlled trial of the Community Resiliency Model (CRM) non-pharmacological treatment. HCW, healthcare worker.

public, discussion of the study findings is included as part of a Medscape/WebMD Resiliency webcast, as well as a VoiceAmerica Health and Wellness Channel 'Resiliency Within' podcast. The broad reach across audiences promotes an understanding of stress threats to well-being and skills for self-care during COVID-19 and beyond.

Measures

The pre-post survey included four previously tested and psychometrically sound instruments measuring emotional health, physical health, work engagement and one custom measure of teamwork and collaboration. Data collection began in October 2020 and finished in June 2021. Intervention participants also provided qualitative feedback describing their use of CRM skills with post-tests (1 week, 3 months). The measures were:

- The WHO-5 Well-Being Index; 5-item scale 0–5, with higher scores indicating greater well-being; range: 0–25; scores are then multiplied by 4 to rescale the total from 0 to 100. The cut-point of poor mental well-being is <50.[23] The cut-point for possible clinical depression is <29. A pre-COVID study found a risk of clinical depression in 11.3% of nurses in an acute care setting.[19]
- An additional two items from the validated Warwick-Edinburgh Mental Well-Being Scale (WEMWBS).[24] This was to extend the WHO well-being measure for

concepts of feeling competent (I've been dealing with problems well) and socially connected (I've been feeling close to other people).

- The Connor-Davidson Resilience Scale-2 (CD-RISC-2); 2-item scale 0–4, with higher scores indicating greater resilience and stress tolerance; range 0–8.[25 26] These items reflect adaptability or rebound from difficulty (I am able to adapt when changes occur and I tend to bounce back after illness, injury or other hardships).
- The Multidimensional Assessment of Interoceptive Awareness-2 (MAIA-2)[27] Noticing subscale; 4-item scale 0–5; range 0–20. A higher score would indicate greater body awareness. Because the crux of CRM is body awareness, the Noticing subscale was of interest. The MAIA-2 has been used to demonstrate the link between interoceptive (body) awareness and mental well-being,[28] and interoceptive awareness has been found to be a key contributor to mental health.[29 30]
- Interprofessional Teamwork Measure, a five-question scale based on the Relational Coordination Inventory[31] and the Intensity of Interdisciplinary Collaboration subscale.[32] Five items: 0–5; range 0–25, focusing on the presence of characteristics necessary for interdependent work with those team members not part of the participant's own profession. Higher scores indicate a perception of better interprofessional relations. The association between stress and loss of attentional focus is well known. Stress can cause a shift to a more individualistic perspective, which in a group context has been found to lead to lower team performance.[33] Team performance is critical to collaboration and necessary to provide optimal patient care.[34] Quality healthcare requires team members from all professional backgrounds work together with patients, their families, caregivers and communities to meet patient needs.[35]
- Shortened UWES-9, 0–6; range 0–54 (total scale) or 0–18 on subscales (vigour, dedication and absorption) operationalised burn-out by measuring a positive, strength-based alternative to the consequence of occupational stress. Higher scores on the UWES-9 indicate higher work engagement and are negatively correlated with burn-out.[36] Measuring work engagement provides a positive contrast to burn-out, aligning with the strengths-based perspective of CRM and consistent with organisational intent for work to be rewarding and meaningful.[1]
- The Somatic Symptom Scale-8 (SSS-8); 8-item scale 0–4; range 0–32. Cut-points indicate none to minimal (0–3), low (4–7), medium (8–11), high (12–15) or very high (16–32) SS burden. The SSS-8 is a short version of the Patient Health Questionnaire-15, reflecting physical symptom burden, and consisting of a general factor as well as gastrointestinal symptoms, pain, cardiopulmonary symptoms and fatigue. SS are often a reflection of stressful and traumatic experiences[37] and these physical complaints are associated with mental conditions such as depression and anxiety.[38 39]
- The Secondary Traumatic Stress Scale (STSS); 21-item scale of frequency of stress symptoms 1–5, with higher scores indicating greater frequency; range of total STSS 21–105, a higher total score indicating more secondary trauma symptoms.[40] Per email communication with the STSS developer, Dr Brian Bride: STSS>43 is high to severe; moderate STSS is 34–42. It is also possible to identify participants who are likely to have PTSD, with the following Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition criteria: one Intrusion item, one Avoidance item, two Negative Cognitions and Mood items and two Arousal and Reactivity items. Note may be made of the relationship between STS and burn-out. Previous research with helping professionals has suggested that burn-out precedes STS.[9]

Participants entered data directly into REDCap, a secure, internally hosted, web-based application designed to support data capture for clinical and translational research databases.[41] Only the two principal investigators, REDCap manager and statistician had access to the data. Descriptive statistics were computed for all demographics and instrument scores at each time point (baseline, 1 week and 3 months). Internal consistency reliability was assessed for each instrument by computing Cronbach's alpha for complete item responses at baseline. Multilevel linear models (MLM) were used to model the repeated longitudinal measures, adjust for missing data due to attrition over time and compare changes over time between the two groups. Post hoc tests were also performed using Sidak pairwise error rate adjustment for the multiple comparisons between time points between groups.[42]

All p values for statistical tests and models are reported, as well as effect sizes for clinically meaningful differences. F statistical models and tests with reported p values and effect sizes (Cohen's d) were computed based on the change scores from baseline to each follow-up time point[43] to evaluate small (d=0.2), moderate (d=0.5) and large (d=0.8) effect sizes to identify meaningful changes.[44] All computations were performed using IBM SPSS Statistics for Windows V.27.0[45] and R V.4.1.0.[46]

RESULTS

A total of 253 HCWs were enrolled in the study (see table 1). The intervention and control groups were statistically similar. The ages of the participants ranged from 23 to 71, average 44 years old (SD 12.4); years worked in healthcare ranged from 0 to 48 with a median of 15 years, and years in current position ranged from 0 to 38 with a median of 3 years. The majority were female (84.6%) and the main type of work was inpatient care (40.3%), followed by outpatient specialty care (14.6%) and administration (11.9%). Nursing (39.9%) was most often reported as the primary role at work (non-mutually exclusive options; ie,

participants could select more than one role), followed by administration, physicians and support services roles. It is noteworthy that at baseline more than half (52.2%) of the participants had poor well-being scores (WHO-5 scores <50) with approximately one-fifth (19.0%) at risk for clinical depression (WHO-5 scores <29). Additionally, 43.4% had high to very high SS burden (SS scores ≥12) and most of the subjects had moderate to severe stress symptoms (82.5%, STSS-5 ≥34).

Quantitative outcome findings are included in online supplemental table 2. There was a lower rate of post-CRM training responses for the intervention group with 44 (34.9%) of the 126 intervention subjects completing their 1-week post-CRM training surveys compared with 94 (74.0%) of the 127 control subjects completing their 1-week surveys ($\chi^2_{(1)}$=38.99, p<0.001). For the 3-month postsurveys, 36 (28.6%) of the intervention subjects completed their surveys compared with 86 (67.7%) of the control subjects ($\chi^2_{(1)}$=38.82, p<0.001). The intervention group's higher attrition may be due to the extra burden of scheduling and attending a class during a stressful time, the first large surge of the pandemic. More than one-third of the intervention participants registered for a class but did not attend, despite reminders. Higher attrition for this group may also be due to the additional time lapse between initial enrolment and data collection.

Among intervention subjects who did complete postintervention surveys, significant improvements for the WHO-5 Well-Being Index, WEMWBS (two items), Interprofessional Teamwork Measure, MAIA-2 Noticing Scale and the STSS were seen compared with the control subjects. Figures 2 and 3 present the results and plots of the longitudinal models of the group, time and group-by-time effects. For well-being, the time and group-by-time effects were statistically significant (p<0.05, figure 2), with significant post hoc tests for the control group from baseline to 3 months with a small effect size (d=0.25), and significant (p<0.001) post hoc tests for changes from baseline to 1 week and baseline to 3 months but with moderate to large effect sizes (d≥0.6) for the improvements in the intervention group. Similar improvements for the intervention group were also seen for WEMWBS (two items) with significant time and group-by-time effects (p<0.001) and significant post hoc tests for changes from baseline to 1 week and baseline to 3 months with moderate to large effect sizes (d=0.49 and d=0.68, respectively). CD-RISC-2 and Utrecht total scores increased slightly in the intervention group at week 1, but no significant group-by-time nor post hoc tests were seen.

There were significant differences between the two groups at baseline for interprofessional teamwork (control group had scores higher than intervention at

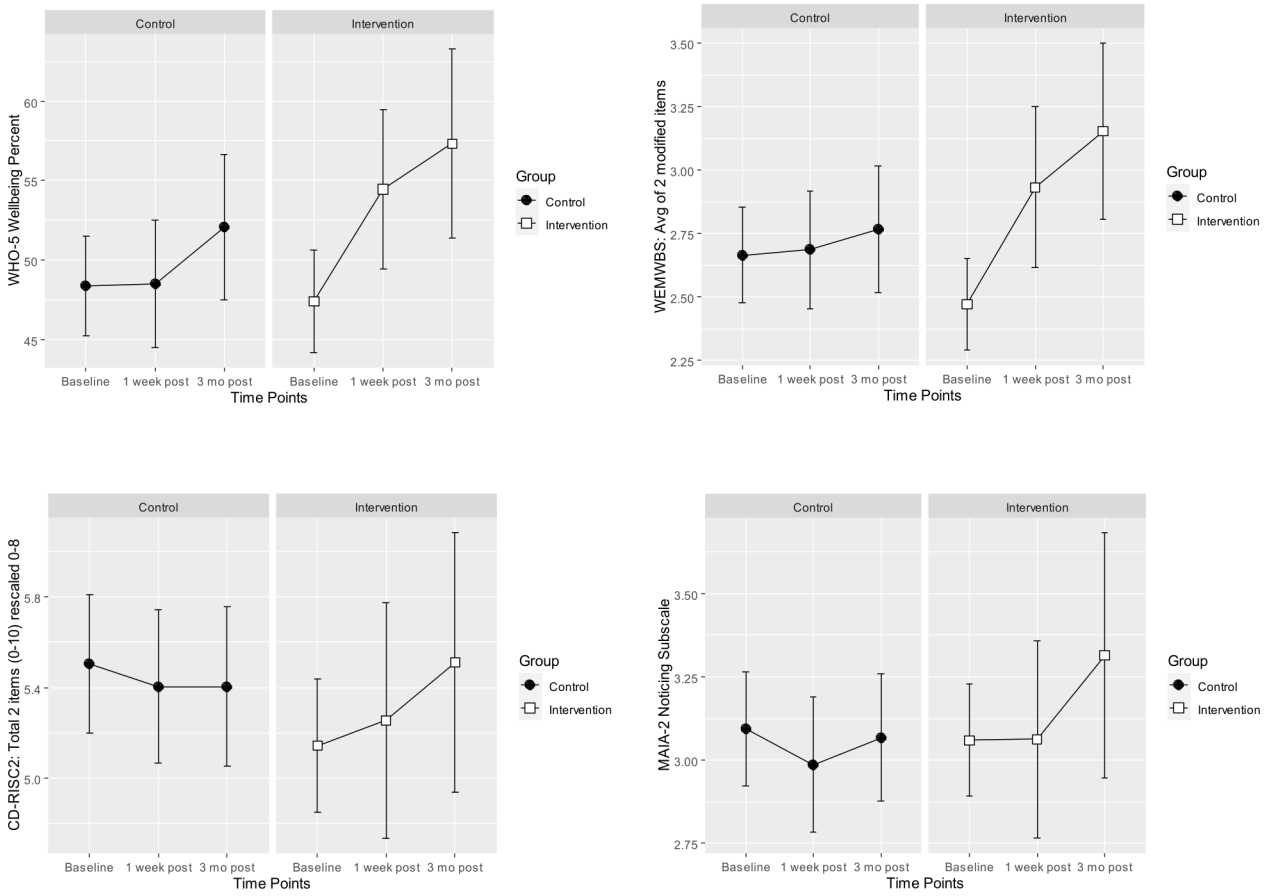

Figure 2 Well-being, resiliency and interoceptive awareness outcomes over time by group. CD-RISC-2, Connor-Davidson Resilience Scale-2; MAIA-2, Multidimensional Assessment of Interoceptive Awareness-2; WEMWBS, Warwick-Edinburgh Mental Well-Being Scale.

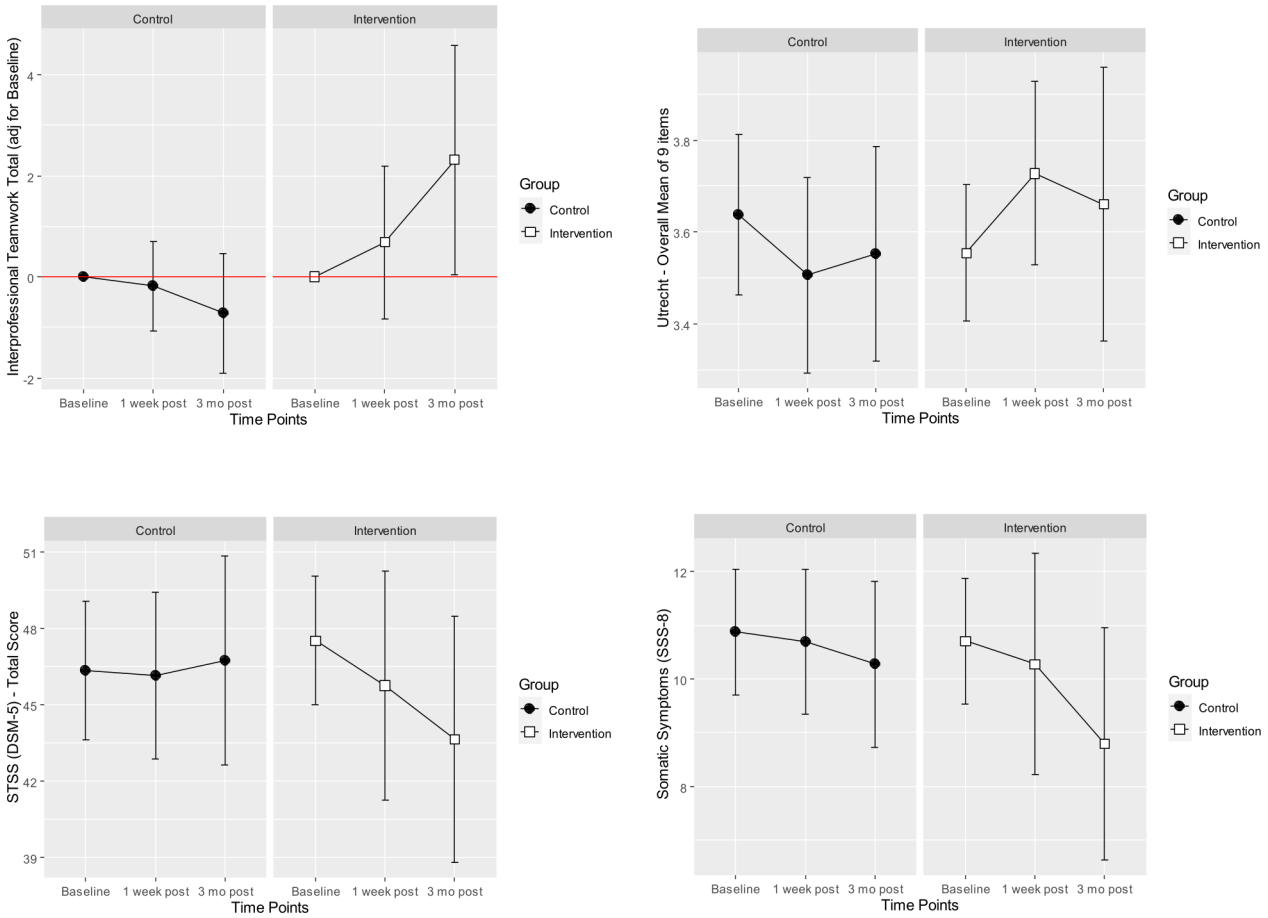

Figure 3 Teamwork, Work Engagement, Stress and Somatic Symptoms Outcomes Over Time by Group.

baseline, p=0.020), so the MLMs were performed on the change scores from baseline. The group and group-by-time effects were significant for changes from baseline (p<0.002, figure 3) with the intervention change scores increasing over time, indicating improvement from baseline (post hoc baseline to 3 months, small to moderate effect size, d=0.35), whereas the change scores decreased over time for the control group, indicating worsening scores. For the MAIA Noticing Scale, there was a significant time effect and group-by-time effect (p<0.02) with a moderate effect size for the changes from baseline to 3 months (d=0.52). SS scores decreased more in the intervention group than in the control group, but these differences were not statistically significantly different. Finally, the STSS (stress) scores had a significant group-by-time effect (p=0.0074) and the intervention group's scores were significantly reduced from baseline to 3 months with a moderate effect size (d=−0.44).

Intervention participants also provided qualitative comments describing their use of CRM skills. These comments demonstrate the skills were appropriately being applied in professional and personal situations. Examples included using the grounding skill when 'dealing with stress', to 'get back to the here and now' and 'after a difficult conversation'. In addition, they reported practising 'my physical experience of feelings', 'calling out colors, sounds, physical touch sensations', 'looking outside at the trees, sky, and nature', 'paying attention to how I feel in my body' and 'breathing consciously' to calm themselves.

DISCUSSION

HCWs were recruited and randomised in a treatment/no treatment design. Treatment was a single, 1-hour, virtual CRM training. We found significant improvements for the WHO-5 Well-Being Index, WEMWBS (two items), Interprofessional Teamwork Measure, MAIA-2 Noticing Scale and the STSS-5 compared with the control subjects. This is the first time that a CRM training of a single hour length, a virtual format and a measure of interprofessional teamwork have been tested. Strengths of the study include its pragmatism and potential rapid application in healthcare organisations and practice settings. Inclusion of all manners of HCWs may be seen as a strength or a limitation as a non-homogeneous convenience sample. Sustainability and benefits of CRM practice beyond 3 months may not be imputed. Self-reported data also posed biases that included social desirability, response bias and sampling bias. The convenience sample and higher attrition in the intervention group underscores the practical nature of the intervention, but limits the generalisability of the findings.

At baseline, about 30% of the 253 HCWs reported good mental well-being, and the average score at baseline for

all participants was 48%, slightly below pre-COVID-19 measures among healthcare providers.[19] This speaks to the resilience of the HCWs. However, the finding that 19% of our sample had scores of less than 29, indicating risk for clinical depression, is considerably higher than the 11.3% identified in the pre-COVID-19 study.[19] The baseline mean of the CD-RISC-2 resilience measure was 5.5 for all participants, which is lower than the prepandemic general population mean of 6.91.[26]

Our short measure of interprofessional teamwork suggested that with just a brief introduction to CRM, participants had a significantly improved perception of team relations, with a moderate effect size (0.41), suggesting a clinically meaningful improvement over the 3-month study period. CRM may support an individual HCW's ability to stay emotionally regulated under stress and to maintain a teamwork perspective. This has implications for quality patient care.

SS scores (SSS-8) for the intervention group showed a consistent decline, with a mean score change from baseline (2.15) just short of a clinically significant change of 3.[47] The prevalence of STS was at 82.5% in the 253 baseline surveys, higher than published findings from other pandemic era studies such as in HCWs who had direct exposure to patients with COVID-19 (47.5%), or with HCWs exposed to patients dying of COVID-19 (67.1%).[48] Another feature of the STSS measure, in addition to severity of stress symptoms, is identification with criteria for PTSD. This study found that 33.3% of participants likely would have a PTSD diagnosis, which is also higher than the 28.9% predicted prevalence of PTSD in an HCW population studied before COVID-19.[19] The higher rate may be attributed to the pandemic; but that the rate is not even higher may point to the presence of an underlying resilience of HCWs.

The MAIA-2 body awareness measure demonstrates the link between interoceptive awareness and mental well-being.[28] The Noticing subscale showed a significant group over time effect with a moderate effect size of 0.52, meaning that the CRM group gained heightened somatic awareness. To our knowledge, the MAIA-2 has not been used to gauge the impact of a mental health intervention, but body awareness by itself has been associated with better clinical outcomes for depression and anxiety,[29] indicating that enteroception interventions may eventually be a treatment option. Further research is needed on the role of interoception in supporting the well-being in HCWs.

The psychometric analysis of the new and untested teamwork measure was promising. Cronbach's alpha was 0.86; the measure has face validity with the concepts of teamwork and interdependence; the five questions were adapted intentionally from two psychometrically sound and tested instruments for the purpose of this study, suggesting content validity. The Work Engagement Scale is more personally versus relationally oriented than the team measure; scores for the intervention group increased compared with the control group and were sustained over time but were only significant for one subscale (vigour) at the 0.06 level with a small effect size. This subscale is conceptually more aligned to the intervention than the two other subscales. In contrast to the decreased energy reported with burn-out, 'vigor' is characterised by high levels of energy and mental resilience while working, the willingness to invest effort in one's work and persistence even in the face of difficulties.[36] More studies may elucidate how CRM affects work engagement.

This study may be compared with other interventional research studies. It is clear from the flurry of recent publications that the mental well-being of HCWs is receiving critical and needed attention, and that mindfulness and coping interventions[4] or more comprehensive wellness interventions[49] are of great interest. Such interventions improve well-being and resilience,[49] but are of considerably longer training duration than CRM. CRM's strength is its brevity and orientation to the body itself as an in-the-moment tool for stress tolerance.

The self-reliance ethos of HCWs may impede access of behavioural healthcare. In a study of stress and alcohol consumption in HCWs, participants were using more alcohol to cope, and while they were open to 'stress management' help, they resisted interventions identified as 'behavioral health'.[50] How an intervention is couched appears to make a difference. It is important to identify and offer interventions that are brief, effective, acceptable, not resource intensive and prevention focused. Healthcare systems also need to manage the work environment to counteract occupational threats to HCW well-being.[1] The pandemic could prompt a needed shift towards systemic resiliency that is more empathetic, relationally oriented and patient centred, facets critical for quality healthcare.[51]

CONCLUSION

HCWs around the world are at risk for mental health sequelae due to the relentless waves of COVID-19 and future disease outbreaks. It is critical to find solutions and ensure the health and safety of the millions in the US and global health workforce.[52] Resilience helps individuals manage stress and maintain an emotionally regulated response to heavy workloads or difficult working conditions. The well-being of the healthcare workforce is essential to maintain a productive and high-performing health system. At present, there is a paucity of evidence for HCW well-being interventions, so this current study adds appreciably to the current knowledge base. CRM is an individual-level intervention, and so will not ameliorate systemic issues that contribute to burn-out, or alone sustain organisational resilience. However, an individual-level intervention like CRM can be a part of larger systems-level solutions. As an accessible set of well-being skills, CRM offers individuals means to persist against adversities such as COVID-19. Organisations can adopt this feasible and prevention-focused approach to bolster individual resilience, creating an added benefit to the

workplace, as emotions and interpersonal interactions can be better managed. CRM skills can also be used with colleagues or clients, so more than just trained individuals benefit. A widespread adoption of CRM can lead to a healthier workforce; necessary to provide safe, quality patient care.

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Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by the Emory University Institutional Review Board (STUDY00001459). The study protocol includes procedures for recruitment and consent (online supplemental file 2). Participants gave informed consent to participate in the study before taking part.

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Table 2: Outcomes over time by group

							Mean	**SD**	**Cohen's d**	**Sidak**
							of Paired	**of Paired**	**of paired**	**Post hoc**
Group	**Time**	**N**	**Mean**	**SD**	**95% CI LB**	**95% CI UB**	**Differences**	**Differences**	**Differences**	**p-value**
WHO-5 Wellbeing *[Cronbach's alpha = 0.838]*										
Control	Baseline	127	48.41	17.81	45.28	51.54				
Control	1 week post	94	48.51	19.69	44.48	52.54	2.09	14.20	0.15	0.7626
Control	3 mo post	86	52.09	21.33	47.52	56.67	4.14	16.42	0.25	**0.0271**
Intervention	Baseline	126	47.43	18.28	44.21	50.65				
Intervention	1 week post	44	54.45	16.51	49.44	59.47	8.73	14.85	**0.59**	**0.0006**
Intervention	3 mo post	36	57.33	17.61	51.38	63.29	10.78	16.45	**0.66**	**<0.0001**
Model Tests: Group F(1, 295.9)=2.4135, p=.1214; Time F(2, 296.4)=15.9269, **p<.0001**; Group-by-Time F(2, 296.4)=4.5622, **p=.0112**										
WEMWBS (modified) *[Cronbach's alpha = 0.658]*										
Group	**Time**	**N**	**Mean**	**SD**	**95% CI LB**	**95% CI UB**	**Mean diff**	**SD diff**	**Cohen's d**	**Sidak p-val**
Control	Baseline	127	2.67	1.07	2.48	2.85				
Control	1 week post	94	2.69	1.12	2.46	2.92	0.10	0.85	0.12	0.8441
Control	3 mo post	86	2.77	1.16	2.52	3.02	0.08	0.90	0.09	0.7645
Intervention	Baseline	126	2.47	1.02	2.29	2.65				
Intervention	1 week post	44	2.93	1.04	2.61	3.25	0.49	1.00	**0.49**	**0.0008**
Intervention	3 mo post	36	3.15	1.03	2.81	3.50	0.74	1.08	**0.68**	**<0.0001**
Model Tests: Group F(1, 294.2)=1.4614, p=.2277; Time F(2, 296.8)=13.4481, **p<.0001**; Group-by-Time F(2, 296.8)=8.3582, **p=.0003**										
SSS-8 total[2] *[Cronbach's alpha = 0.822]*										
Group	**Time**	**N**	**Mean**	**SD**	**95% CI LB**	**95% CI UB**	**Mean diff**	**SD diff**	**Cohen's d**	**Sidak p-val**
Control	Baseline	119	10.87	6.45	9.70	12.05				
Control	1 week post	89	10.70	6.43	9.34	12.05	-0.63	4.00	-0.16	0.8231

Control	3 mo post	84	10.27	7.16	8.72	11.83	-0.90	5.07	-0.18	0.2944
Intervention	Baseline	116	10.71	6.34	9.54	11.87				
Intervention	1 week post	43	10.28	6.70	8.22	12.34	-1.02	5.01	-0.20	0.4574
Intervention	3 mo post	35	8.80	6.30	6.64	10.96	-1.03	5.53	-0.19	0.1957
Model Tests: Group F(1, 269.2)=0.3629, p=.5474; Time F(2, 274.6)=3.1072, **p=.0463**; Group-by-Time F(2, 274.6)=0.2818, p=.7547										
STSS-5 total[2] *[Cronbach's alpha = 0.921]*										
Group	**Time**	**N**	**Mean**	**SD**	**95% CI LB**	**95% CI UB**	**Mean diff**	**SD diff**	**Cohen's d**	**Sidak p-val**
Control	Baseline	106	46.35	14.16	43.62	49.08				
Control	1 week post	82	46.16	14.95	42.87	49.44	-0.95	8.26	-0.11	0.9770
Control	3 mo post	73	46.75	17.56	42.66	50.85	1.37	11.61	0.12	0.7802
Intervention	Baseline	105	47.52	13.05	45.00	50.05				
Intervention	1 week post	37	45.76	13.53	41.24	50.27	-2.03	8.29	-0.24	0.4879
Intervention	3 mo post	32	43.66	13.41	38.82	48.49	-4.58	10.47	**-0.44**	**0.0042**
Model Tests: Group F(1, 250.3)=0.5076, p=.4768; Time F(2, 237.0)=2.4901, p=.0851; Group-by-Time F(2, 237.0)=5.0107, **p=.0074**										
CD-RISC2 (rescaled 0-8) *[Cronbach's alpha = 0.838]*										
Group	**Time**	**N**	**Mean**	**SD**	**95% CI LB**	**95% CI UB**	**Mean diff**	**SD diff**	**Cohen's d**	**Sidak p-val**
Control	Baseline	127	5.51	1.74	5.20	5.81				
Control	1 week post	94	5.40	1.66	5.06	5.74	0.04	1.23	0.03	1.0000
Control	3 mo post	86	5.40	1.64	5.05	5.76	-0.08	1.37	-0.06	0.9685
Intervention	Baseline	126	5.14	1.66	4.85	5.44				
Intervention	1 week post	44	5.25	1.71	4.73	5.77	0.25	1.43	0.18	0.7672
Intervention	3 mo post	36	5.51	1.70	4.94	6.09	0.44	1.32	0.34	0.1481
Model Tests: Group F(1, 293.6)=0.5803, p=.4468; Time F(2, 292.2)=0.9906, p=.3726; Group-by-Time F(2, 292.2)=1.7058, p=.1834										
Utrecht Total *[Cronbach's alpha = 0.907]*										

Group	**Time**	**N**	**Mean**	**SD**	**95% CI LB**	**95% CI UB**	**Mean diff**	**SD diff**	**Cohen's d**	**Sidak p-val**
Control	Baseline	127	3.64	0.99	3.46	3.81				
Control	1 week post	92	3.51	1.03	3.29	3.72	-0.08	0.57	-0.15	0.4099
Control	3 mo post	85	3.55	1.08	3.32	3.79	-0.04	0.67	-0.05	0.8769
Intervention	Baseline	124	3.55	0.83	3.41	3.70				
Intervention	1 week post	44	3.73	0.66	3.53	3.93	0.18	0.62	0.29	0.2226
Intervention	3 mo post	35	3.66	0.87	3.36	3.96	0.13	0.78	0.17	0.4338
Model Tests: Group F(1, 281.6)=0.2356, p=.6278; Time F(2, 272.8)=0.3592, p=.6986; Group-by-Time F(2, 272.8)=2.7586, p=.0652										
Collaboration and Teamwork – original scores[1] *[Cronbach's alpha = 0.868]*										
Group	**Time**	**N**	**Mean**	**SD**	**95% CI LB**	**95% CI UB**				
Control	Baseline	126	19.56	5.46	18.60	20.53				
Control	1 week post	92	18.91	4.86	17.91	19.92				
Control	3 mo post	85	18.73	5.81	17.48	19.98				
Intervention	Baseline	121	17.91	5.66	16.89	18.93				
Intervention	1 week post	44	18.95	5.54	17.27	20.64				
Intervention	3 mo post	35	19.80	5.85	17.79	21.81				
Collaboration and Teamwork – baseline adjusted[1]										
Group	**Time**	**N**	**Mean**	**SD**	**95% CI LB**	**95% CI UB**	**Mean diff**	**SD diff**	**Cohen's d**	**Sidak p-val**
Control	Baseline	126	0.00	0.00	0.00	0.00				
Control	1 week post	92	-0.18	4.25	-1.06	0.70	-0.18	4.25	-0.04	0.9795
Control	3 mo post	85	-0.72	5.49	-1.90	0.47	-0.72	5.49	-0.13	0.3555
Intervention	Baseline	121	0.00	0.00	0.00	0.00				
Intervention	1 week post	44	0.68	4.97	-0.83	2.19	0.68	4.97	0.14	0.6796
Intervention	3 mo post	35	2.31	6.60	0.05	4.58	2.31	6.60	**0.35**	**0.0029**
Model Tests: Group F(1, 297.9)=10.0841, **p=.0017**; Time F(2, 400.3)=1.6990, p=.1842; Group-by-Time F(2, 400.3)=6.4297, **p=.0018**										

MAIA – Noticing Scale *[Cronbach's alpha = 0.826]*										
Group	**Time**	**N**	**Mean**	**SD**	**95% CI LB**	**95% CI UB**	**Mean diff**	**SD diff**	**Cohen's d**	**Sidak p-val**
Control	Baseline	126	3.09	0.98	2.92	3.27	0.00	0.00		
Control	1 week post	92	2.99	0.98	2.78	3.19	-0.04	0.75	-0.05	0.935
Control	3 mo post	85	3.07	0.89	2.88	3.26	0.02	0.79	0.03	0.9989
Intervention	Baseline	121	3.06	0.94	2.89	3.23	0.00	0.00		
Intervention	1 week post	44	3.06	0.97	2.77	3.36	0.05	0.90	0.06	0.9974
Intervention	3 mo post	35	3.31	1.07	2.95	3.68	0.54	1.02	**0.52**	**0.0020**
Model Tests: Group F(1, 281.0)=1.2268, p=.2690; Time F(2, 287.9)=5.2005, **p=.0060**; Group-by-Time F(2, 287.9)=4.0630, **p=.0182**										

[1] There was a significant difference at baseline between the 2 groups for the collaboration and teamwork scores: control group had higher scores than intervention, p=.020). So, the model was rerun using the scores adjusted for baseline.
[2] Since lower scores were desired for PS and STSS-5 scores, the change scores are presented as baseline minus post scores instead of post scores minus baseline used for other measures presented in the table.

1. Study Summary

Study Title	Supporting the mental health of healthcare workers during COVID-19.
Study Design	Randomized Controlled Trial
Primary Objective	To support resilience in healthcare workers during a time of increased stress.
Secondary Objective	To enhance inter-professional teamwork and patient care by providing a universal approach to self care and respect for others.
Research Intervention	Brief training in trauma informed care and somatic awareness.
Study Population	Healthcare Workers
Sample Size	300
Study Duration	3 months
Study Specific Abbreviation	CRM: Community Resiliency Model TRI: Trauma Resource Institute IPE: Interprofessional education
Funding Source	WHSC IPEC Synergy Grant

2. Objectives:
Purpose: To examine whether CRM training resulted in improved resilience for nurses attending training.

Specific Aims:
1. Increase participants' sense of wellbeing both 1 week and 3 months after the training intervention, compared to participants who did not receive the training intervention.

2. Increase participants' reported work engagement, both 1 week and 3 months after the training intervention, compared to participants who did not receive the training intervention.
3. Test the reliability and validity of an instrument designed to measure the effect of using the Community Resiliency Model as an intervention to improve well-being.

3. Background

The implications of the current pandemic include the "second wave" of mental health concerns to come. In the meantime our healthcare workers have a compounded threat to their wellbeing as front line care providers and as citizens who have been forced to undergo change to their natural support structure such as extended family, childcare, or previous self-care routines. Working with emotionally-distraught clients or in stressful work situations puts healthcare workers at higher risk for secondary traumatic stress, burnout and mental health problems, such as depression, anxiety, suicidality, or post-traumatic stress disorder (PTSD). Yet, healthcare workers are often unavailable to participate or unwilling to seek out needed mental health support due to increased work demands, the associated stigma of mental health, concern over confidentiality, and the historical culture of self-reliance or stoicism in their work settings. As a result, front line personnel often receive little or no mental healthcare (Jones, 2016). This can result in negative consequences for patients and employers because of the decreased quality of care that can follow compromised well-being (Letvak, Ruhm, & McCoy, 2012). The intervention for this study will be Community Resilience Model (CRM) training. This model was found to be protective of burnout for nurses who received a 3 hour CRM training (Grabbe, 2018). Emotion regulation skills that are gained from CRM can improve coping in the face of stress and trauma and therefore can increase resilience. Increased resilience can protect from burnout and thereby maintain or increase engagement in work and the interprofessional team.

The Mental Health of Front-Line Service Providers

Healthcare and public safety professionals can suffer from a range of mental health symptoms. Three principle conceptualizations of care providers' stress have been described: compassion fatigue, secondary traumatic stress, and vicarious trauma (McGibbon, Peter, & Gallop, 2010). Burnout, another cumulative response to stress, is characterized by emotional exhaustion, depersonalization, and loss of a sense of personal accomplishment (Panteleoni et al., 2014). To cope with these syndromes, people may engage in unhealthy or high-risk behaviors, such as substance abuse, which makes the need for preventative intervention even more compelling.

Nurses

Research on nurses has shown high rates of anxiety, depression, burnout, and PTSD (Day, 2015; Stathopoulou et al, 2011; Letvak, Ruhm, & McCoy, 2012; Mealer et al., 2009; Shu-Ti, et al., 2013; Gao et al., 2012). A survey of over 1,000 North Carolina hospital nurses showed an 18% rate of depression, which is double the national average (Letvak, Ruhm, & McCoy, 2012). A survey of over 300 Colorado hospital-employed nurses demonstrated anxiety (16%), depression (13%), post-traumatic stress disorder (PTSD) (18%), and burnout (86%); overall, of the nurses in this study, 89% had mental health symptoms (Mealer et al., 2009). The impact of mental health problems among nurses is serious, impacting quality of work, the rate of medical errors, and the intention to terminate employment (Garrouste-Orgeas, 2015; Chang & Chang, 2012). Among nurses, the health-related loss of productivity due to work-related poor mental health has been estimated at $2 billion dollars per year (http://www.inqri.org/grantee/dr-susan-

letvak). Many nurses simply leave nursing for other professionals when they become "burned-out."

Coronavirus Pandemic

There is genuine concern about the post-pandemic mental well-being of front-line healthcare workers (Greenberg et al., 2020; Lai et al., 2020), as well as general members of the public at this time of stay-at-home recommendations. A preventative mental wellness intervention may reduce the aftermath of depression, anxiety, and PTSD for many.

The mental well being of front-line providers was identified as a critical concern, but preventative mental health care for these groups is just beginning. Many resilience interventions are multimodal or otherwise cumbersome. They are lengthy, complex, and often costly; such as cognitive reframing, yoga, exercise, meditation, Reiki, journaling, massage, guided imagery, and Healing Touch (Mealer et al., 2014; Chesak et al., 2015; Potter et al., 2013). "Critical incident stress debriefing," commonly used for first responders, refers to processing of trauma after it has occurred, so is not a prevention intervention. Cognitive behavior therapy, a highly accepted, evidence-based, individual or group therapy, may be inadequate for front-line providers because of the postulated biological nature of trauma experiences. A new direction in trauma therapy and mental wellness self-care focuses on biologic approaches (van der Kolk, 2014), and this is the approach proposed here. The above research studies implicitly and explicitly underscore the need for preventative interventions to increase resistance to stress, improve mental well being, and increase resiliency among front-line service providers.

Evidence for the Community Resiliency Model

CRM is **derived from well-established somatic and sensory-motor psychotherapies (**Heller & LaPierre, 2012; **Levine, 2010; Ogden, 2015). CRM has a "bottom-up" approach, as opposed to the standard "top-down" or cognitive approach. CRM targets autonomic nervous system regulation through an awareness of sensation in the body. This awareness of internal sensation, also called "interoception," is well developed in highly-resilient elite athletes and military commandos (Haase et al, 2016) and may be developed or cultivated. In CRM training, participants learn to understand the biology of their reactions to stress and trauma; they also learn specific skills** to track sensations connected to their wellbeing or resilience. The skills may increase the person's ability to return from a dysregulated emotional state to a balanced state when the nervous system becomes overwhelmed, and these same emotion regulation skills may be of value in one's ongoing ability to handle stress.

CRM is innovative, and it is an acceptable means to improve emotion regulation with a growing body of research to support its effectiveness. The **Department of Defense designated CRM a "promising practice" (Miller-Karas, 2015)**, and one study of CRM trainees demonstrated a significant improvement in symptoms of depression, anxiety, hostility, and bodily pain **(**Citron & Miller-Karas, 2013). Front-**line service providers in disasters also demonstrated the positive benefits of CRM techniques.** Following Hurricanes Katrina and Rita, the CRM intervention (then called TRM) was used with 91 social service workers who demonstrated statistically lower PTSD symptoms and increased resilience compared with a control group (Leitch, Vanslyke, & Allen, 2009). Finally, in the aftermath of the Sichuan Province earthquake in China in 2008, Leitch and Miller-Karas (2009) trained more than 350 doctors, nurses, teachers, and counselors in six cities during the 18-month period following the earthquake. Their

evaluation demonstrated that 88% used the skills in their work and over 60% used the skills for their own self-care (Leitch and Miller-Karas 2009). CRM's evidence continues to accumulate. The first randomized controlled trial of CRM in 77 hospital nurses found reduced secondary traumatic stress and physical health problems in the participants, as well as improved emotional well-being and resiliency after a single 3-hour "dose" of CRM (Grabbe et al., 2019).

CRM has only had minimal testing in healthcare workers during this pandemic. Further research can help us understand its effectiveness in emotional regulation and whether this may improve productivity and satisfaction in current jobs during this time of added stress. This current project can contribute to the growing body of evidence while providing an innovative, resiliency- enhancing intervention for workers at increased risk for compromised mental health and well-being, potentially compromising the effectiveness of the entire interprofessional team.

4. Study Endpoints

Measures of wellbeing, work engagement, and sensory experience integration will be collected as evidence that this is a useful model to address wellbeing and protect from the second wave of health consequences from COVID 19 on our healthcare workforce and the patients they care for. These measures will be collected at baseline, one week after intervention and three months or more after intervention.

5. Study Intervention/ Design

The Community Resiliency Model (CRM), proposed here as a preventative mental wellness promotion intervention, is a low-cost, low-intensity training. This intervention is consistent with a call by the Institute of Medicine (IOM) in its 2015 Report on Psychosocial Interventions for Mental and Substance Use Disorders to use mental health programs incorporating interpersonal strategies targeting biological, behavioral, cognitive, interpersonal, social, or environmental factors to meet the goal of improving health functioning and wellbeing.(IOM, 2015). CRM was developed originally as a psychological first aid tool in disaster situations, where cognitive models were inadequate and too lengthy. It has evolved into a model of mental wellness skills, which can be easily learned and practiced (Miller-Karas, 2015). The practice of these skills contribute to resiliency and the ability to withstand stress, without losing flexibility or adaptability.

6. Procedures Involved

This study will use qualitative and quantitative methods to determine the impact of 1.) CRM skills on emotional state 2.) Sense of well-being, and 3.) Work engagement 4.) CRM-Sensory experience. These quantitative measures will be collected 1 week post-training, and 3 months post-training. Data analysis will include whether participants took advantage of the options of additional electronic information to reinforce their learning. All nurses in the state of Georgia will be invited to participate in the sessions. Nurses will register for a one or three hour online training being provided for free by the Georgia Nurses Association or other organizations such as the Georgia Association of School Nurses and Grady Hospital. The CRM training will include instruction, demonstration, and participation in skill-building activities through an interactive, virtual but synchronous video platform. Only healthcare workers from the local healthsystem will be invited to participate in the study.

The CRM teaching content will be taken directly from existing CRM skills training materials. The PI, Ingrid Duva, and other certified CRM trainers will deliver the content. Content of the session includes the CRM skills: tracking, resourcing, grounding, gesturing, help now, and shift and stay. The neurophysiology of stress and trauma responses will be taught and is foundational to the teaching of the skills. Handouts and PowerPoint slides will be used. Demonstration and practice during the training allows for immediate use and refinement of the skills. Use of the free 15-minute CRM app (ichill), which describes the CRM skills, will be encouraged; for those without a smart phone, the app is available at www.ichillapp.com. This app is an overview of the skills and rationale for the model. Regardless of the length of the session, training will provide a brief overview of the model and introduce skills and tools that can be immediately accessed during times of emotional dysregulation as well as to prevent dysregulation.

Virtual training about the model will be offered at numerous times during November through January. The second part of the intervention, viewing the film “Resilience” will occur in December. The film reinforces the model, raising awareness of the effects of trauma on the body. Two trainers participate during the session interventions. This allows for a dynamic presentation, supervised practice of the skills, and for support to participants in the unlikely event that any individual be emotionally dysregulated while learning the skills.

At the end of the training all participants will be provided a link to access the study instruments. This is voluntary and will require not only the decision to proceed with the provided measures but also an informed consent. Approximately 4 surveys, consisting of approximately 40 responses, will be completed by the participant on their device of choice and submitted upon completion. All tools and informed consent will be transferred back to the researchers via the RedCap tool. Post-test surveys of the measures will be requested at 1 week and 3 months after initial training

Brief written evaluations at the end of the training sessions and in the post-tests will ask about the usefulness and acceptability of the CRM training. Resilience, and the effectiveness of the CRM Skills will be measured by self-report tools (WHO well-being, Uchtrect’s work engagement, a somatic experience scale), Job satisfaction, intent to leave current position will be asked in a single question format. At the 1 week and 3 month survey request, questions will be included to probe the extent and use of trained skills and how participants have used them in work or personal situations.

Research Instruments

Well-established, valid, and reliable instruments have been selected for the pre/post-tests:

1. A demographic survey (age, gender, years worked in healthcare, years in current position, type of work)
2. Utrecht Work Engagement Scale (17 items); The Utrecht results, if improved, imply a more engaged, enthusiastic workforce. A highly engaged workforce has been shown to provide higher quality care.
3. WHO Well-being Scale (5 items) - self-reports current well-being. This score should go up or stay the same for the experimental group.
4. CRM-SES, A Sensory Experience Scale, measures the effectiveness of the CRM training and integration of the foundational tracking scale. (approx 10 questions)

7. Data Specimen and Banking – N/A

8. Sharing of Results with Participants

Findings will be shared with participants via email or virtually after study analyses are concluded. A formal written summary will be provided to the WHSC in April 2021. These findings may also be disseminated through peer-reviewed journals, which will potentially benefit a larger population of service providers who work in emotionally-taxing environments.

9. Study Timeline

The study will begin in September 2020 with recruitment. The two-part training intervention will occur in October through December. For the intervention participants, the study is completed by March 2021, after the three-month survey completion. Analyses will begin immediately. Initial results will be written up and reported back to the Woodruff Health Science Center by April 2021. For the controls, there will be an opportunity provided to receive the intervention after their three-month data is collected. Tis opportunity will include an additional consent to continue with data collection. For those control participants, should they choose to attend a training, the study will end 3 months later once they have had the opportunity to complete post training surveys. Final results will be compiled in August 2021.

10. Subject population

Inclusion Criteria: All healthcare workers at participating health centers who have not participated in CRM training in the past. Volunteers who comprise the sample will be recruited through their workplace. The distribution of information related to the study will follow the recommendation of the Healthcare systems.

Exclusion Criteria: None

11. Vulnerable Populations – N/A

12. Local Number of Participants

This study targets a local population. We will aim for 300 participants. 100 volunteers are needed for the intervention arm of the study and 100 for the control (volunteers who will not receive training).

13. Recruitment Methods All interprofessional team members in the organizations affiliated with the local Healthsystems can participate and this invitation will be distributed via email. Volunteer participants will register themselves for the training. Once the training begins information about the study will be provided via a link. There will be no remuneration for participation. Study participants will need to be motivated to provide data that may ultimately help other healthcare workers. The flyer will mention free apps or wellness resources for persons who do not want to participate but are feeling stressed.

14. Withdrawal of Participants - There are no anticipated circumstances that would lead to the withdrawal of participants without their consent. If participants choose not to continue providing data once the first round of surveys are completed, their data will be handled in the analysis as a baseline or comparison and will not be able to fulfill the study purposes for the extended analysis of survey responses.

15. Risks to Participants

Some of the CRM skills exercises might be challenging, for example, describing sensations in the body, but in general, none of the skill practice should aggravate emotional distress. Participants are always given the option of not trying out the skills. If accessing body sensations causes discomfort or emotional triggering in anyone, a trainer will be available to help the participant.

16. Benefits of Participation

It is expected that the CRM skills training will have direct benefits for participants. The benefits of CRM may include a state of reduced reactivity to stress and increased ability to focus; these skills may enhance the resilience of the participants, i.e., the ability to bounce back from stress or trauma and increase their emotion regulation ability. If participants are not comfortable using certain CRM skills, they need not practice them. The findings of the study will be disseminated through peer-reviewed journals, which will potentially benefit a larger population of service providers who work in emotionally-taxing environments. Findings will also be shared with participants via the host organization's webpage.

17. Data Analysis, Management and Confidentiality

All REDCap data will be entered into SPSS software and analysis of the data will take place in the principal investigator's office. Data will be cleaned; descriptive statistics will be run to understand the sample. Experimental and control group means will be compared using t-tests. Logistic regression will be used to determine if the assessment scores for CRM-SES are associated with the well-being and work engagement scores. Demographic surveys and the data from the quantitative and qualitative evaluation surveys from participants will be shared in a summary format.

18. Provisions to Monitor the Data to Ensure the Safety of Participants

Participants who show signs or identify signs of emotional dysregulation during the intervention (training) will be contacted by trained study team members for regulation or referral. These participants will be asked to immediately terminate intervention training. A list of trauma-focused therapists will be made available to all participants.

Data collection will consist of pre and post-intervention surveys. The quantitative data will be entered into the SPSS system at the School of Nursing, identified by the participant code number only. The monitoring plan consists of the PI reviewing all data and following up on any concerns or trends seen in the data that may implicate there are safety concerns for any participants. Any adverse events noted will be reported to the IRB.

19. Provisions to Protect the Privacy Interests of Participants and Confidentiality of Participants' identifiable data.

The data file will be password protected, and stored on a secure drive. All completed data collection instruments will be kept in a locked file in Dr. Duva's locked office in the School of Nursing. No names will be collected on any of the instruments. Only personnel associated with the study will have access to the surveys or the files on the secure drive. All research personnel will complete CITI training in Human Subjects (or its equivalent) research.

20. Economic Burden to Participants

No economic burden is anticipated for participants in this study. It is a free training and only minimal time is required to complete the post training surveys.

21. Consent Process

Written consent to participate in the CRM study will be obtained electronically before beginning the pre training survey. Participants will be advised that the decision not to participate, or to cease participation at any time will not affect their work situation. Participants will be providing their consent remotely, from their own chosen training location. Based on the education of the population, healthcare workers, it is expected that providing a written explanation in English will be adequate to assure understanding. After consultation with IRB staff in similar studies, it was determined that the general nature of the survey will not require HIPAA patient protection clauses in the consent.

22. Setting

The setting for this study is at the local Healthcare system and the surrounding community and metro-area. Potential participants will be recruited from the healthsystem. Recruitment flyers will be distributed electronically explaining the study and inviting volunteers. The intervention participation and the follow up research questionnaires will be completed at the participants own convenience in the setting of their choice. Unit and hospital leadership will be consulted in the recruitment phase and be aware of the study but the training and the film viewing will be offered virtually, not necessarily on the hospital campus or other healthcare setting.

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