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DEVELOPMENT OF A WEB-BASED SCALABLE INTERVENTION TO REDUCE MENTAL HEALTH RISKS IN MEDICAL EXAMINER PERSONNEL

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This paper describes the development of a scalable intervention to reduce risk for depression and posttraumatic stress among medical examiner employees. Medical examiners identify the deceased, determine the cause and manner of death, and communicate this information to various stakeholders including law enforcement, public health authorities, and families of victims. Basic research has revealed that aspects of their job responsibilities, including working on disturbing cases and interacting with highly distressed families of the deceased, are associated with symptoms of depression and posttraumatic stress, and these relationships are partly mediated by concerns about alienation and distress intolerance. However, employees do not receive systematic training in the skills needed to manage the emotional labor demands associated with work responsibilities. To address these unmet needs, a pilot study was conducted to develop a scalable, web-based intervention to decrease symptoms of depression and posttraumatic distress. The intervention consisted of self-paced programed intervention modules based on empirically validated treatments including psychoeducation, social modeling, values affirmation, exposure, and skills training tailored to the specific job demands of medical examiners. The program was delivered to personnel in nine offices in six states. Consumer satisfaction data indicate that participants found the intervention, including the exercises, clear and useful. Overall, 53% of the employees who consented to participate enrolled in at least one class and half of them completed eight or more of 16 classes. The program is feasible to administer in the workplace and shows preliminary evidence of efficacy. Employees demonstrated a reduction in depressive symptoms over time.

Key words: Web-based intervention; Medical examiners; PTSD; Depression; Social cognition.

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This paper describes the development of a scalable intervention to reduce risk for poor mental health among first responder personnel, specifically medical examiner (ME) employees. First responders (including police officers and firefighters) are at risk for direct and vicarious exposure to trauma (Haugen, Evces, & Weiss, 2012). Depending on the type of job, potentially traumatic situations can include threats to their own health and safety, witnessing threats to the health and safety of others, and activities that expose individuals to human remains and highly gruesome situations (e.g., incidents involving suicide, burn victims, and death of a child) (Benedek, Fullerton, & Ursano, 2007; Brondolo, Wellington, Brondolo, Brondolo, & Delahanty, 2012; Haugen et al., 2012). Witnessing damaged human remains and handling bodies have been associated with the development of posttraumatic stress symptoms (Alexander & Klein, 2001; Brondolo et al., 2012; Halpern, Gurevich, Schwartz, & Brazeau, 2009).

In addition, first responders as well as other types of employees (e.g., nurses, lawyers) may experience vicarious traumatization from interacting with highly distressed individuals, including relatives of the victims of a traumatic event, who are themselves traumatized (Baird & Kracen, 2006; Clohessy & Ehlers, 1999; Halpern et al., 2009; Palm, Polusny, & Follette, 2004). Indirect and vicarious trauma exposures, particularly those associated with interacting with distressed victims and their family members, often co-occur with exposure to direct trauma (Clohessy & Ehlers, 1999). These vicarious exposures may exacerbate the mental health consequences of other types of exposure to traumatic events (Coleman, Delahanty, Schwartz, Murani, & Brondolo, 2016).

Medical examiner employees are first responders who have been relatively understudied. ME offices are involved in identifying the deceased and determining the cause and manner of death. They are also responsible for communicating this information to a variety of stakeholders including law enforcement, public health authorities, and families of victims (Hanzlick & Combs, 1998).

Medical examiner offices house a variety of personnel including pathologists, investigators, clerical and administrative staff, laboratory personnel, and autopsy technicians. All types of employees are exposed to potentially traumatic events when they have contact with human remains and disturbing scenes during the process of death investigations. They may be directly exposed to these remains either at the scene or in the autopsy suite, and/or may be indirectly exposed to disturbing cases via contact with case files or pictures (Brondolo et al., 2012). ME employees are also at risk for vicarious exposure to trauma through their interactions with highly distressed or angry families of deceased individuals (Coleman et al., 2016). If there are difficulties identifying the victim (e.g., if the remains are fragmented after an explosion) or if the investigation of the manner of death is complex, ME employees may have sustained interactions with distressed family members (Brondolo et al., 2012; Brondolo, Wellington, Brady, Libby, & Brondolo, 2008).

In addition to exposure to potentially traumatic events, the overall stress burden of ME employees is increased by the emotional labor associated with their job responsibilities. Emotional labor refers to the demand to manage the experience and expression of feelings (i.e., adjust facial expressions and/or body language) during emotionally taxing interpersonal situations at work (Zapf, 2002). MEs engage in emotional labor when they interact, face-to-face or on the phone, with highly distressed family members of the deceased (Brondolo et al., 2012). In these circumstances, the management of facial (or vocal) expressions may be required, if the family members are angry or highly distressed, and the employee recognizes that his or her emotion ex-

pressions during the conversation must remain constrained. The demand for cultural and social sensitivity around death also requires that ME employees pay special attention to the language and tone used when communicating to family members and others (Cahill, 1999).

In our prior research with convenience samples of ME personnel across the USA, we examined the relationship of exposure to disturbing cases and contact with families of the deceased to symptoms of posttraumatic stress disorder (PTSD) and depression. Disturbing, high intensity cases included multiple fatalities, deaths of infants and children, dismembered remains, and fire-damaged remains. We found that the intensity of exposure to disturbing cases was positively associated with PTSD and depressive symptoms, and the frequency of contact with family members of the deceased was associated with depressive symptoms. High levels of contact with families of the deceased exacerbated the relationship of high intensity case exposure to PTSD and depressive symptoms (Coleman et al., 2016).

To develop an approach to reduce mental health risks potentially associated with ME work, we drew on cognitive and social-cognitive models of PTSD and depression. Cognitive models suggest that individuals develop PTSD symptoms when they have difficulty integrating new experiences into existing knowledge structures (Ehlers & Clark, 2000). These knowledge structures are composed in part of schemas, linked networks of thoughts, feelings, images, and sensations (Landau, Meier, & Keefer, 2010).

Traumatic events violate pre-existing schemas about the world, other people and oneself, and change expectations about the meaning of traumatic and other types of events (Beck, 2005; Halvorsen et al., 2009). In particular, traumatic events may change perceptions of self-efficacy (Benight & Bandura, 2004), including beliefs about one's ability to tolerate the experiences of distress evoked by traumatic events (Marshall-Berenz, Vujanovic, Bonn-Miller, Bernstein, & Zvolensky, 2010). Trauma exposure also has effects on social relations and individual's schemas about their relationships to others. As a function of the trauma exposure, individuals may feel different from or alienated from others, and develop concerns about being a burden or rupturing relationships. Social-cognitive models of PTSD suggest that social constraints on the communication of traumatic experiences may trigger and maintain negative schemas and contribute to posttraumatic symptoms (Belsher, Ruzek, Bongar, & Cordova, 2012). Negative social interactions may also have a bidirectional relationship with negative schemas and contribute to the development and maintenance of depressive symptoms (Hammen, 2006).

We hypothesized that MEs have knowledge structures for perceiving and interpreting technical aspects of their work. For example, ME employees are likely to have developed schemas about human remains and the meaning of these remains for issues related to justice or victim identification or other aspects of their job responsibilities. In part, these knowledge structures develop through training and work experience, as pathologists, investigators, autopsy workers, and laboratory personnel receive training in the technical aspects of their job responsibilities.

However, ME personnel generally do not receive systematic training in the skills needed to manage the emotional aspects of the job, including the demands for emotion regulation evoked by witnessing disturbing events or interacting with highly distressed families. The training they receive generally does not include skills in developing multiple approaches for regulating emotions evoked by workplace responsibilities (Brondolo et al., 2008). The lack of specific guidance for processing high intensity emotions in themselves or others may potentiate the development of other negative schemas about the self.

For example, in our prior studies of ME employees, negative schemas about the self, specifically thoughts related to alienation or self-stigmatization (e.g., "I have permanently changed for the worse," "I feel isolated and set apart from others"), mediated the relationship of case exposure to PTSD and depressive symptoms. These negative schemas about alienation also mediated the relationship of family contact to depressive symptoms. Prospective analyses indicated that negative schemas about the self, specifically beliefs about alienation, were associated with an increase in symptoms of PTSD and depression (Brondolo, Eftekharzadeh, Clifton, & Delahanty, 2017).

To facilitate the ability to develop emotion regulation skills that could prevent mental health symptoms in ME personnel, we developed a web-based intervention that draws on social-cognitive theories of the development of depression and PTSD applied to the workplace. The primary goals of the intervention were to enhance employees' abilities to structure threatening information; to create richer, more meaningful positive schemas about their work and to decrease negative schemas; and to reduce the barriers to social support and engagement. As our preliminary data and interviews with ME personnel indicated that working with families of the deceased exacerbated the effects of direct trauma on PTSD and depression (Coleman et al., 2016), we focused the intervention on strategies for improving emotion regulation during interactions with highly distressed family members.

We chose to use a web-based approach, because we needed to develop an intervention which was efficient and scalable. ME and coroner personnel are distributed nationwide in close to 2000 offices (Department of Justice, 2007), making it unlikely that evidence-based interventions could be consistently delivered to personnel at all sites. The web-based intervention was delivered in a series of interactive classes. These classes could be accessed by all personnel either during work time or while at home.

Intervention Approaches

Although there is limited empirical research available concerning treatment of PTSD in first responders, psychosocial treatments, specifically those encompassing components of cognitive behavioral therapy (CBT) and psychodynamic therapy, have shown preliminary signs of efficacy (Haugen, et al., 2012; Haugen, Splaun, Evces, & Weiss, 2013). In randomized controlled trials, CBT and brief eclectic psychotherapy (BEP) an intervention which utilizes components of both psychodynamic therapy and CBT (i.e., psychoeducation, relaxation exercises, imaginal/experiential exposure, and cognitive reprocessing among other techniques) have demonstrated the strongest treatment effects (Haugen et al., 2012). Strategies, including virtual exposure and subsequent cognitive processing, may reduce symptoms by allowing the individual to 1) develop knowledge structures which accommodate the traumatic experiences; 2) learn to tolerate physiological responses (e.g., anxiety); 3) understand the links between experiences of trauma and particular emotional and physiological responses; and 4) develop a sense of meaning associated with these experiences (Haugen et al., 2012, 2013).

The web-based training entitled "Advanced training to manage difficult and disturbing cases" consisted of a series of evidence-based interventions for both PTSD and depression tailored to the specific experiences of ME personnel. Specifically, psychoeducation on the relationship between ME-related work responsibilities and stress was presented, and guided relaxation

exercises were provided. Exposure-based exercises were deployed in which employees were presented with videos of actors portraying highly distressed family members. These exposure exercises were used to permit employees to habituate to their own emotions and to develop new knowledge structures for evaluating both the family members' emotion activation and their own emotional responses. Social modeling strategies were employed to help employees recognize and articulate different types of negative schemas that might form in response to stressful situations. Values affirmation strategies were employed to help participants generate more positive schemas, and to strengthen the meaning they derived from their job responsibilities. Specific communication skills were included to provide direction for employees to generate more effective strategies for communicating with the families of the deceased.

Adapting the intervention to a web-based delivery made it low cost and scalable. Classes were accompanied by quizzes and tests. Employees could access the program at their worksite or anywhere they had web-access over a 12-week period. This paper provides information about the development of the program and preliminary analyses of the outcome data, focusing on levels of participation, consumer satisfaction, and the two primary outcome variables — symptoms of depression and PTSD.

METHOD

Program Development

To tailor the intervention, we worked with professional organizations including the National Association of MEs and the American Board of Medico-Legal Death Investigation and other regional and statewide coroners' societies. Key informant interviews with more than 40 individuals and analyses of surveys of workplace stressors and health outcomes provided information about the topics and specific script content to be used in the intervention. One ME office served as a test site with employees providing detailed feedback about script content and initial versions of the web-based classes. The institutional review boards of St. John's University and Kent State University approved all procedures for the intervention and evaluation.

The intervention was deployed across six states in the USA and involved nine offices. All testing and the intervention program itself were implemented via the web. Surveys were administered via SurveyMonkey (https://www.surveymonkey.com). Participants were given time at work to complete the course. Employees who were eligible to receive continuing education credit (i.e., investigators and pathologists) were able to receive continuing education for the program at no cost.

The training program consisted of 21 self-paced programed instruction (SPPI) classes, divided into three modules. The three modules themselves contained a total of 16 classes each of which was five to seven minutes in length. These classes presented the didactic and experiential components of the intervention. There were four additional brief classes, which served as introductions to the program and modules, and one longer class, which presented relaxation exercises. All classes were presented on video, using Adobe Captivate. The videos were constructed to permit participants to view slides with explanatory text either after or alongside videos, which presented either a narrator or an actor playing an employee or family member. Actors "told the stories" of work stressors, the reactions they elicit, and possible coping responses. A narrator provided psychoeducational information and interpretation of the "employees" experiences and

reactions. After most classes (with the exception of those presenting relaxation exercises), participants completed a short quiz on the information presented and/or wrote brief essays in response to prompts asking them to describe their own thoughts and feelings about workplace situations.

Module 1 provided psychoeducation about the nature of stress exposure. Participants learned about components of the stress response. They were encouraged to distinguish between the technical and emotional aspects of the job, and to identify which components served as stressors. Next, they were familiarized with components of the stress response, including appraisals and coping. Participants were provided with guided practice in relaxation exercises including autogenics, progressive muscle relaxation, and diaphragmatic breathing.

Module 2 included exercises involving exposure to high intensity emotions, schema identification, and values clarification. The goal of the exposure exercises is to permit employees to enhance awareness of feelings and to habituate to the experience of emotions evoked by highly distressed family members. During the first exposure exercise, participants viewed an actor portraying a very angry family member yelling at the camera and complaining about an autopsy. In the second exposure exercise, an actor portrayed a mother, who had lost her young son, crying for three minutes. Participants were asked to watch the videos several times and to focus on regulating their breathing and permitting themselves to become aware of their own feelings as they watched the videos. In the next set of exercises, social modeling techniques were employed to make underlying negative schemas about distress intolerance, stigmatization, and social isolation more accessible. Actors portraying employees articulated different negative schemas and associated thoughts and feeling which may be activated in response to work stressors including interactions with emotionally intense family members. During values affirmation exercises, social modeling techniques were employed as actors discussed different values they hold about work and connected these values to their emotional responses to different work responsibilities. Participants were asked to write essays describing their own negative schemas and their own values.

Module 3 provided additional psychoeducation focusing on PTSD and depression. Finally, social modeling was employed to provide communication skills training and to provide guidance for developing more elaborated schemas about the thoughts and feelings of family members and other public and private individuals served by the office. An actor playing a seasoned employee modeled and explained a script for engaging distressed family members as the employee obtained information from and imparted information to the family of the deceased.

Participants were enrolled in the program at their worksite. The Principal Investigator (PI, E. Brondolo) traveled to each site to ensure the web program was accessible and easy-to-use for all employees at the site. The initial baseline screening was initiated at the time of the first visit. Additional face-to-face contact with employees occurred at the time of the pre-treatment baseline and post-treatment evaluations to obtain additional feedback on the intervention and evaluation process. Participation in the course and all evaluation materials were tracked online. All responses to intervention materials were monitored daily in order to ensure that we could respond quickly to requests for psychiatric referral or to evidence of severe distress.

The effects of the program on key dependent variables, including symptoms of depression and posttraumatic stress were evaluated using a stepped wedge design. Stepped wedge designs are commonly employed in field tests of interventions where randomized control trials would be prohibitively expensive or impossible (Bonell et al., 2009; Spiegelman, 2016). Sites were registered for participation one at a time. An initial baseline testing was performed at the

first site, and a (second) pre-treatment testing was performed three months later. Next, the program was in place for three months after which post-treatment testing was conducted. Follow-up post-treatment testing was conducted a month later. The second site completed initial baseline testing at the same time the first site was completing the pre-treatment testing. Similarly, as the second site initiated pre-treatment testing, the third site began the initial baseline testing. This process continued over a two-year period until all sites had completed testing. The delay between the initial baseline and pre-treatment testing was necessary to determine the stability of symptoms and to ensure that all individuals received referrals for outside clinical care if necessary. Two participants requested assistance with referrals for mental health services.

Participants

All individuals employed at each of the nine ME offices at the time the study was initiated at their site, were invited to participate in the program via email ($N = 376$). Of these, 272 consented to participate in the outcomes surveys and the training program, and 258 completed the initial baseline survey. A total of 143 (53%) participants initiated the training program, of whom 76 (53%) participants completed eight or more classes. The mean number of training classes completed was 10.69 ($SD = 7.74$, range 1-21). A total of 113 of the 272 participants completed a sufficient number of surveys to permit evaluation of treatment effects (i.e., a minimum of one pre-treatment and one post-treatment survey), and 89 of these participants also participated in the intervention.

The 143 employees who participated in the training (i.e., those who completed at least one class) included 88 women and 53 men (two were missing gender information). The majority of the participants were over 30 years of age ($N = 121$), with 54 participants over 50 years of age. As is the case in the offices themselves, most participants identified as White ($N = 111$, 78%). The next largest racial group of participants was comprised of Black Americans ($N = 14$, 10%). Employees from all job categories participated in the training including: 23 MEs, 38 investigators, 22 autopsy technicians, 30 clerics/administrators, 18 laboratory workers, and 12 other personnel (e.g., clergy, legal staff, and facilities managers).

Measures

Consumer satisfaction. Consumer satisfaction data were obtained following each online training class, in the form of training evaluation surveys delivered following the quizzes and essays administered at the end of each class. All training evaluation data were completely de-identified, and devoid of the participants' subject identification number to permit anonymity. Participants were asked to evaluate each class along three dimensions: the degree to which materials accurately reflected their work experiences, and the degree to which the ideas were presented clearly and were helpful. Items were rated on a 4-point scale from strongly disagree to strongly agree.

Outcome evaluation measures. Outcome survey information on sociodemographic data, symptom reports, and other measures were administered online via SurveyMonkey. Participants were reminded up to five times by email to complete each survey. If they did not complete the post-treatment outcome survey, we substituted the follow-up survey administered one month after program completion.

Sociodemographic data. A standard questionnaire was used to assess age, gender, race/ethnicity, marital status, highest level of education completed, and job category. To protect confidentiality of participants, we obtained information about age ranges (i.e., less than 30 years of age, 31-50 years of age, and 51 or greater years of age) instead of exact ages.

Depressive symptoms. Depressive symptoms were assessed with the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), a 21-item self-report measure intended to assess severity of depressive symptoms. We eliminated the item inquiring about suicidal ideation. The BDI-II has good test-retest reliability (r = .93, p < .001) and internal consistency (α = .92) (Beck et al., 1996), and also demonstrated good internal consistency in the present sample (α = .88).

Posttraumatic stress disorder symptoms. PTSD symptoms were assessed with the Posttraumatic Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997). The PDS is a self-report measure that provides an estimate of diagnostic levels of PTSD and also allows calculation of a continuous measure of PTSD symptom severity. In this sample, the total symptom severity score had very good internal consistency (α = .92).

Data Analysis

Descriptive statistics were employed to summarize participation and consumer satisfaction ratings. Chi-square and ANOVA procedures were used to evaluate differences between those who did versus did not participate in training or complete the outcome surveys. ANOVAs were conducted to examine demographic differences in the outcomes. Mixed linear model analyses of variance using Proc Mixed (SAS Institute 9.2) were used to evaluate changes over time in symptoms of depression and posttraumatic stress.

RESULTS

There were no gender, age, race, or job title differences in the proportion of participants who completed the training or the outcome surveys (all ps > .06). Individuals who initiated the training (vs. did not) were more likely to be long-term employees, with six or more years of experience, N = 86 of 143 (60%), χ^2 = 4.82, p < .03. Similarly, those who completed all three surveys were more likely to be long-term employees, N = 70 of 113 (62%), χ^2 = 4.19, p < .05.

There were significant differences among sites in the proportion of participants who completed the outcomes survey with the highest completion rates occurring in the smaller sites, $\chi^2(5)$ = 27.69, p < .0001. In the smaller sites (i.e., those with less than 50 employees available to participate), nearly half or more employees completed the surveys (completion rate ranging between 46-75%). In contrast, the completion percentages from larger sites ranged between 26-46%. Similarly, training participation rates also varied by site, with four sites having participation rates above 62% (range 62-92%). The two largest sites had lower participation rates of 25% and 37%, $\chi^2(5)$ = 47.63, p < .0001. Therefore, site was included as a control variable in all-subsequent analyses.

There were no significant differences in training participation by depressive symptoms at the initial baseline, $F(1, 256)$ = 0.22, p = .64. However, those who participated had significantly

lower symptoms of PTSD at initial baseline (M =3.16, SD = 5.64) than those who did not initiate training, M = 4.70, SD = 7.42; $F(1, 266) = 3.72$, $p = .05$.

Consumer satisfaction ratings were available from only 21 individuals due to technical and other difficulties. As introductory classes were not evaluated, participants could have evaluated a total of 17 classes. Participants rated the usefulness, clarity, and appropriateness of the classes on a 4-point scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, and 4 = *strongly agree*). On average, participants found the presented information useful (M = 3.15, SD = 0.66), clear (M = 3.24, SD = 0.78), and the examples/exercises appropriate (M = 3.30, SD = 0.50).

Consumer satisfaction ratings were high among those who completed the ratings: 91% of participants agreed (46% strongly agreed) that the program provided useful information; 86% agreed (48% strongly agreed) that the information was presented clearly; and 86% agreed (43% strongly agreed) that the workplace examples and exercises were appropriate and useful. There were no adverse events reported, and two employees requested additional assistance obtaining mental health services during the time the program was underway.

Analyses of demographic differences in outcome measures revealed significant effects of gender on initial baseline levels of depression, $F(1, 256) = 3.87$, $p = .05$, and posttraumatic stress symptoms, $F(1, 266) = 5.04$, $p < .05$. Women reported higher levels of symptoms than did men. There were also significant differences among sites (i.e., among the six states) in posttraumatic stress symptoms, $F(5, 260) = 2.69$, $p < .03$, but post-hoc pairwise comparisons did not reveal consistent patterns and there was not a significant difference between any pair of sites. The effects of job title on depression, $F(4, 234) = 1.86$, $p = .12$, and posttraumatic stress, $F(4, 241) = 1.75$, $p = .14$, did not reach significance in this analysis, but in previous studies with larger samples, we have observed variations by job title. Therefore, in subsequent analyses gender, site, and job title were included as covariates. There were no age differences in symptoms of depression, $F(1, 255) = 0.69$, $p = .5034$, or PTSD symptoms, $F(2, 265) = 1.53$, $p = .2185$.

Mixed models analyses of variance (SAS 9.2) using the Satterthwaite approximation for the degrees of freedom were conducted to test the primary hypotheses that the intervention would reduce symptoms of depression and posttraumatic stress. Assessment time served as the repeated predictor variable with three levels (initial baseline, immediate pre-treatment, and post-treatment). Analyses controlled for gender, site, and job title. When analyses were restricted to participants who completed eight or more classes, the effect of assessment time on depressive symptoms was significant, $F(2, 57) = 8.07$, $p < .001$. Post-hoc examination of the differences in depressive symptoms between each point in time revealed that depressive symptoms did not change from the baseline to pre-treatment evaluation period, $t(56) = .37$, $p = .71$, suggesting stable levels of depressive symptoms prior to intervention. There were significant differences between initial baseline and post-treatment, $t(56) = 3.81$, $p < .001$, and between pre-treatment and post-treatment, $t(54) = 2.40$, $p = .02$. Adjusted levels of depressive symptoms were significantly lower at post-treatment (M = 3.77, SE = 1.28) than at pre-treatment (M = 5.04, SE = 1.32) or initial baseline (M = 5.24, SE = 1.30).

In a sensitivity analysis performed on all those who participated in at least one class, the effect of time remained significant, $F(2, 75) = 8.02$, $p < .01$. Depressive symptoms were not significantly different in the initial baseline and pre-treatment evaluation periods. Changes from initial baseline to post-treatment, $t(64) = 3.94$, $p < .01$, and pre-treatment to post-treatment, $t(77) = 2.67$, $p < .01$, were significant. Similarly, in an intent-to-treat analysis including all participants

who completed the initial baseline survey, the main effect of time on depressive symptoms remained significant, $F(2, 88) = 9.59$, $p < .002$. Again, there was a significant decrease in depressive symptoms from initial baseline to post-treatment, $t(74) = 4.16$, $p < .001$, and from pre-treatment to post-treatment, $t(85) = 3.26$, $p < .002$.

Among those who participated in any classes, depression symptoms decreased by 1.5 points on the BDI from baseline to post-treatment and 1.3 points from pre- to post-treatment following three months of treatment. There were no significant changes over time in PTSD symptoms (*p*s > .50 in all analyses).

CONCLUSION

To our knowledge, this program is the first web-based targeted intervention for MEs, an understudied group of first responder employees. The findings support the notion that investigators can and should tailor empirically validated treatments to the needs (identified via basic research) of specific groups of employees. This pilot study demonstrated that delivering the program at the worksite or at home is feasible and safe, and the program shows preliminary evidence of acceptability and efficacy at reducing depressive symptoms.

Basic research from our laboratory and others helped to identify triggers of depressive and PTSD symptoms in first responder samples, including MEs. Social cognitive mediators of the relationship between workplace responsibilities and mental health symptoms were identified. This research, combined with extensive focus group and key informant interviews, enabled us to tailor the treatment to the employees' identified needs. The treatment involved a combination of exposure, psychoeducation, and social modeling exercises, which incorporated information about specific work stressors in the ME work environment. The specificity of the examples is likely to make transfer of training to the real world setting more feasible. Limited consumer satisfaction data indicated that the employees perceived the case examples and commentaries to be relevant to their workplace experiences. Self-paced instructional programming permitted employees to acquire skills at their own pace (Goldrick, 1987; Theron, 1999; Uhlemann, Hearn, & Evans, 1980; Vichitvejpaisal et al., 2001).

The pilot program to develop the intervention achieved many of its major goals. Sites across the USA participated. About half of the consented participants initiated training. The program was well received. The intervention reduced depressive symptoms. However, there were some limitations to the program. The intervention did not reduce posttraumatic stress symptoms. Individuals with higher levels of posttraumatic stress symptoms were less likely to participate. One possibility is that anticipation of emotional pain and avoidance symptoms associated with PTSD may have deterred participation. The lack of participants with higher levels of PTSD may have led to an inability to demonstrate an effect on PTSD. Additional efforts may be necessary to recruit those with PTSD symptoms. New strategies, including providing sample classes (i.e., in the form of trailers) or other approaches, may be needed to facilitate participation by those concerned about side effects of the classes, including emotional distress.

Overall, the findings suggest that low intensity worksite interventions including internet/web-based interventions may be cost-effective and beneficial as a first line program to improve employee skills in emotion regulation at work. These skills may reduce mental health risks associated with dangerous or emotionally demanding work responsibilities. Low-intensity interven-

tions are encapsulated under the umbrella of "self help" as either oneself or non-clinical staff can facilitate the delivery of these interventions. These interventions reduce barriers to care due to their ability to reach wider populations, including those who may resist treatment due to stigma (Amstadter, Broman-Fulks, Zinzow, Ruggiero, & Cercone, 2009; National Collaborating Centre of Mental Health, 2011). As was the case in this pilot program, many web-based interventions utilize empirically based treatments and have been shown to be efficacious in treating depression (Richards & Richardson, 2012) and anxiety (Amstadter et al., 2009; Reger & Gahm, 2009).

This program may have implications for other types of employees who face high demands for emotional labor or are at risk for vicarious or direct trauma exposure. For example, physicians may benefit from these skills when they are required to deliver "bad news" to hostile or highly emotional family members (Dosanjh, Barnes, & Bhandari, 2001; Rabow, Hauser, & Adams, 2004). Other first responders may also benefit from similar approaches as they report interacting with family members is one of the most stressful parts of their work (Baird & Kracen, 2006; Clohessy & Ehlers, 1999; Halpern et al., 2009; Palm et al., 2004).

The pilot project also provided important insights into the challenges facing worksite web-based mental programs. Initial technical problems with the video upload undermined participation. It is also worth noting that at the time of the implementation of this intervention, the technology for deploying web-based classes was still in its developmental phase. Technological advances available today can allow for richer, more interactive experiences.

There are some contagion effects that work both for and against these types of programs. In small sites employees interact frequently across levels and can support each other's efforts to participate. In larger sites with much larger workplaces, casual supports for engagement are less feasible. We also found that evaluation materials need to be delivered separately from the intervention itself and potentially in shorter and user-friendly formats. Anecdotal evidence suggested that longer programs (i.e., both in the number of classes and the duration of total class time) also deter participation.

Limitations

There are some limitations of this study. As this was a pilot program, a randomized clinical trial was not performed. Instead we implemented a stepped wedge design, in which each site served as its own control and as a control for the next site. The program was web-based, but as is the case with most effective Internet interventions, there were live therapists available. The PI, a licensed psychologist, had brief contact with all participants at each site as the program was established in their offices. It will be critical to test this program in MEs and other high-risk populations using a randomized control trial, applying "lessons learned" about worksite interventions.

Programs focused on increasing emotion regulation capacities in high-risk occupations are necessary to supplement other forms of technical training. These programs can address the burdens placed on employees by the emotional labor required by their job responsibilities. Despite the limitations imposed by the pilot nature of the program, a combined program of research and intervention can provide insight into strategies for strengthening psychological capital among the first responder community. These low intensity, web-based interventions may provide a first-line prevention and intervention program to reduce employee mental health risks. The findings suggest that empirically based mental health interventions can be tailored to the specific workplace culture of a target population.

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