A multi-module web-based COVID-19 Anxiety and Stress Resilience Training (COAST): Single cohort feasibility study in first responders

Janna Marie Heyen, Noé Weigl, Mario Müller, Stefan Müller, Urs Eberle, Andrei Manoliu, Stefan Vetter, Adam D. Brown, Thomas Berger, Birgit Kleim

Submitted to: JMIR Formative Research
on: February 19, 2021

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Abstract

Background: Since the emergence of COVID-19, health care workers and first responders have been at high risk for mental health symptoms due to their exposure to the virus and higher work stress during the pandemic. Although interventions exist to address mental health issues following exposure to disasters, emergencies, and humanitarian crises, considerably less is known about web-based unguided interventions to help mitigate the negative impacts of such events. Additionally, in contexts in which emergencies reduce access to in-person care, remote forms of support are critical, yet there remains limited research on the use of such interventions. Evidence-based, easy to use and scalable interventions are direly needed for this population.

Objective: To develop and feasibility-test an unguided e-mental health program tailored to first responders and health care personnel based on scientific evidence and empirically based techniques.

Methods: We developed COVID-19- specific training modules focusing on several domains that previous research has indicated as key to resilience and stress recovery: self-efficacy, mindfulness, sleep, and positive thinking. The program was made available to 702 first responders between May and August 2020, during the COVID-19 pandemic. Sociodemographic, work- and COVID-19-related information were collected, and psychometric questionnaires completed. We examined user acceptance and user activity, including module choice and participant feedback.

Results: Seven percent of all first responders we reached out to, n= 52, used the program at least once. COAST use was independent of age, sex, or baseline levels of self-efficacy, mindful awareness, sleep quality and positive thinking, all P >. 39. First-responders who had been tested positive and those who had been quarantined were more likely to engage in the program. A click-count analysis per module showed that participants used the self-efficacy and mindfulness modules most often, 382 and 122 clicks over 15 weeks, respectively. Overall, first responders expressed satisfaction with the program.

Conclusions: Engagement of first responders in a multi-module web-based COVID-19 Anxiety and Stress Resilience Training program was feasible and the first responder cohort expressed overall satisfaction with the program. Those in more difficult circumstances, i.e., in quarantine and those tested positive, may be more likely to engage in such programs. Further controlled studies could pave the way for efficacy studies and development of additional modules, including just-in time interventions or blended interventions combining individual use of an unguided self-help intervention, such as COAST, with subsequent individual psychotherapy for those who continue to experience stress and psychological symptoms.

(JMIR Preprints 19/02/2021:28055)

DOI: https://doi.org/10.2196/preprints.28055

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Original Paper

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Abstract

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Methods: We developed COVID-19- specific training modules focusing on several domains that previous research has indicated as key to resilience and stress recovery: *self-efficacy*, *mindfulness*, *sleep*, and *positive thinking*. The program was made available to 702 first responders between May and August 2020, during the COVID-19 pandemic. Sociodemographic, work- and COVID-19-related information were collected, and psychometric questionnaires completed. We examined user acceptance and user activity, including module choice and participant feedback.

Results: Seven percent of all first responders we reached out to, n= 52, used the program at least once. COAST use was independent of age, sex, or baseline levels of self-efficacy, mindful awareness, sleep quality and positive thinking, all $P >$. 39. First-responders who had been tested positive and those who had been quarantined were more likely to engage in the program. A click-count analysis per module showed that participants used the self-efficacy and mindfulness modules most often, 382 and 122 clicks over 15 weeks, respectively. Overall, first responders expressed satisfaction with the program.

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Keywords

Resilience, first responders, mental health, e- mental health, self-efficacy, Mindfulness, sleep

Introduction

Starting early in 2020, the SARS-Cov-2 Coronavirus (COVID-19) began to severely impact the daily lives of a majority of the world's population after a cluster of infections was first identified in China as early as December 2019 [1]. In most countries of the world, including Switzerland, severe measures were taken to prevent the further spread of the virus, including strict safety and hygiene rules and physical distancing. Lockdown and physical distancing, along with perceived unpredictability and uncertainty, may lead to social isolation, loss of income, loneliness, inactivity, limited access to basic services and other compromises. COVID-19 has thus resulted in an increase in known risk factors for psychiatric disorders, such as depression and anxiety [2]. A number of studies documented significant effects on the population's mental health, with studies reporting higher levels of depression in the general population [3] Health care workers and first responders were often found at high risk for mental health issues due to their greater exposure to the virus and higher work stress during the pandemic [4-7] and showed increased mental health symptoms [8].

With physical distancing and other restrictions in place and a decreased mental health system capacity, calls for increased investment in telehealth and telepsychiatry, as well as other digital mental health solutions emerged [9-11]. Digital mental health prevention and intervention programs offer effective, often unguided and scalable solutions to improve mental health. These can often be used anonymously, making their use lower threshold than in-person therapy [12-14], as well as accepted by users [15]. Early interventions could be key to prevent overburdening mental health care systems during and after the COVID-19 pandemic [16, 17]. Indeed, some e-mental health interventions have already been implemented in different countries during the pandemic [e.g., 18-20]. Studies on the feasibility and effectiveness of e-mental health interventions for medical personnel and first responders, however, remain scarce. A recent review found three publications about mental health programs specifically targeted at medical personnel during the pandemic using

e-mental health approaches [21]. However, there is evidence for the efficacy of e-mental health approaches for these populations in other circumstances. A blended e-mental health intervention to manage weight was effective in a sample of first responders and included interventions on sleep and psychological symptoms [22]. Another 3-month online-intervention to reduce work-related fatigue and improve work function resulted in a small positive effect on overall stress in health care workers [23]. E-mental health interventions are thus a promising way to support health care workers and first responders in general and possibly during crises, including the current COVID-19 pandemic. Not all current approaches are based on empirical evidence or employ principles of evidence-based treatment approaches for psychiatric disorders, such as cognitive behavior therapy [24]. To help close this gap, we developed a research-based e-mental health program tailored to first responders and health care personnel that was firmly rooted in scientific evidence and empirically based techniques, self-paced and unguided, as well as delivered anonymously. Our study thus aimed to (1) develop research-based online COVID-specific training modules focusing on the key areas self-efficacy, mindfulness, sleep, positive thinking to increase resilience in health care workers and first responders, (2) assess sociodemographic, COVID-19-related and stress-related characteristics of first responders opting into using the program and (3) examine user acceptance and user activity, including choice of different modules and participant feedback.

Methods

Study Design

This study was designed as single-cohort feasibility study to evaluate a Corona Anxiety and Stress Resilience Training, COAST, and receive user feedback for future adaptation of our modules. The study was approved by the ethics committee of the philosophical faculty of the University of Zurich. We included first responders who were offered free and unlimited access to the program. The first users and study participants joined COAST in May 2020 and final questionnaires were completed in

July 2020. Our analyses cover an overall period of 15 weeks during which participants were followed during their individual use of the program.

The COAST-Program

COAST comprises four intervention modules to increase resilience in the face of stress due to the COVID-19 pandemic. These modules were made available on a website for free and self-paced perusal by our participants. The self-paced option appeared relevant in order to adapt to the busy schedule of health care workers during the pandemic. All four modules are stand-alone modules and target (1) self-efficacy, (2) sleep, (3) mindfulness, (4) gratitude and positive reframing, respectively. Choice of these module topics was based on previous research that identified them as useful targets to improve resilience in the face of stress and adversity [e.g., 25-28] and on the target population's documented preference for e-mental health interventions to be focused on well-being, rather than ill health [29].

Each module contained explanations and mini-interventions that users could engage in in their daily lives based on previous results and protocols and adapted for online use. The self-efficacy module was based on findings that activating autobiographical memories of perceived self-efficacy can help strengthen clinically relevant factors for tolerating distress [30], as well as promoting relevant cognitive processes and problem solving that might help patients recover from stress [31]. Users are asked to recall three memories of situations, they handled well and write down which hurdles they overcame and which traits, qualities, and strengths helped them with it. The sleep module consists of a worry diary and tips for better sleep hygiene, both proposed by Altena et al. [32]) and the European academy for cognitive behavioural therapy for insomnia. The module concerning mindfulness includes various audio files with guided meditations. Studies in populations of health care workers found mindfulness to be associated with reduced depressive symptoms, more adaptive defense mechanisms against stress, lower burnout and stress-levels, as well as higher life-satisfaction [33-

35]. These findings are supported by a meta-analysis that reported mindfulness-based interventions to be an effective tool to help medical personnel cope with stress [26]. COAST's gratitude module is made up of a gratitude diary, users can fill in daily. Killen and Macaskill [36] proved a gratitude diary could positively influence wellbeing and found no difference in efficacy between paper-pencil and online version of the intervention. The use of interventions that train gratitude has further been proven effective in various studies [e.g., 36-38], partially focusing on health care workers.

Decisions in favor of shorter interventions and questionnaires were taken in light of previous findings highlighting the sometimes low participation rates of health care workers and first responders, and their high workload [39].

Recruitment

We recruited first responders in Zurich from Schutz & Rettung Zürich, an urban first responder organisation providing first aid in the greater Zurich region. For our study, all 702 first responders in the service, including mostly ambulance workers and fire fighters, were invited to use COAST via email. Fifty-two of them used COAST at least once and were included in the study. The emails contained an invitation to take part in the study with the purpose to evaluate COAST and a link to the first set of study questionnaires (baseline) immediately after sign-up. Furthermore, users were asked to fill in a short questionnaire on the website and were sent reminders to do so. Inclusion criteria were being a first responder at the abovementioned institution, consent, and sign-up to the COAST-program. Participants in the study were offered to enter a raffle and win one of multiple vouchers by entering a draw at the end of each external questionnaire. Due to the exploratory nature of the study and our interest in feasibility indices that are largely independent of sample size, a power analysis was not conducted.

Procedure

Participants chose an anonymous user name, as privacy of e-mental health interventions had been

raised as an important issue to first responder interventions previously [22]. They were also asked to complete self-report questionnaires that were sent via email and that could be completed online. These links were sent at three timepoints: at baseline, i.e., after registration and prior to starting COAST (Questionnaire 1), at two weeks (Questionnaire 2), and at four weeks (Questionnaire 3). Questionnaires 2 and 3 also included a user experience questionnaire. They also were asked to complete several items covering each module's target outcome (self-efficacy, mindfulness, sleep, optimism) on the COAST-website.

Personnel of Zurich's first responders who were interested in using the COAST-program were sent a login-code for the COAST program via email. The program was delivered via a custom-built university website. For those participating in the study, the code was also used to match program-based data from the COAST-website (user indices, questionnaire items on the website) with other questionnaires that were sent to participants via a link to their browser and filled in online to ensure anonymity. Use of the data for study purposes was agreed to by the users when entering their code prior to COAST use, and at the beginning of each questionnaire that was filled in outside of the program. All questionnaires were filled in online. Three reminder emails were sent for questionnaire completion.

Measures

Participants filled in items embedded in the COAST program as well as separate questionnaires at baseline and two and four weeks follow-up. Questionnaire completion was not mandatory for using the program and the number of users who completed questionnaires varied. We thus report on various different sub-samples.

Questionnaires

We employed standardised, validated self-report measures at baseline (Questionnaire 1) and follow-up (Questionnaires 2 and 3), including the *Perceived Stress Scale* (PSS; [40]) (Cronbach's alpha

= .95), the *Patient Health Questionnaire* (PHQ-9; [41]) (Cronbach's alpha = .83), the *Generalised Anxiety Disorder Scale* (GAD-7; [42]) (Cronbach's alpha = .89), the *General Self-efficacy Scale* (GSES; [43]) (Cronbach's alpha = .76), and the *PTSD-Checklist for DSM-5* (PCL-5; [44]) (Cronbach's alpha = .95). An adapted version of the *Client Satisfaction Questionnaire* (CSQ-8; [45]) was used in questionnaires 2 and 3 to assess the user's satisfaction with the online program. For our study, we adapted CSQ-8 items to refer to "the online program", instead of "the service", "the clinic" or "the treatment". No further modifications were made. In our sample, the measure had a very good internal consistency (Cronbach's alpha = .94). We also employed an open question on potential further suggestions to optimize the program ("Do you have ideas, suggestions, or criticism for us that could help us make COAST better?").

Within the COAST program, sociodemographic, work and COVID-related question were completed. We also included key questions corresponding to each of the target modules taken from the validated questionnaires. Users were asked to fill in the questions when they started using the program. The questions measured stress ("How nervous or stressed do you feel today?), perceived self-efficacy ("How much do you currently believe in being able to change things in your life?"), mindfulness ("I am in contact with my experiences here and now"), sleep quality ("How would you judge your sleep quality since the last log-in?") and optimism/ positive thinking ("I have a positive outlook on the future"). Users answered the questions on a scale of 0-10, for stress, self-efficacy, optimism and 0-3, for sleep and mindfulness, respectively.

Activity scores were calculated over 15 weeks based on users' activity in the program, reflecting the number of accesses to individual pages of the program, including repeated access to the same page.

Statistical Analysis

All statistical analyses were conducted in RStudio, Version 1.3.959 for Mac OS [46]. We calculated

means, standard deviations, and percentages for sociodemographic and COVID-19-related variables, other questionnaire and activity scores. Number of clicks per page were grouped per module and clicks per module counted to determine differences in user activity (n=52). Correlations were calculated between questionnaire item scores and user activity. Pearson's correlation was used where normality distribution assumptions were met and adjusted to non-parametric testing in all other cases. We applied one-sided significance testing and a *P*- value of $P = .05$.

Results

Characteristics of first responders opting into COAST-use and associations with user activity

Sociodemographic information and scores on in-program questions are displayed in Table 1. The sample comprised 52 first responders (42.9 % female), of which 42 completed within-program questionnaires. Mean age was 43 years (SD = 10.53) and 26 % of the sample had been quarantined at any time point, 2.38% were quarantined at the time of filling in the questionnaire. Moreover, 21% worked or had worked in direct contact with COVID-19-patients. Two percent of our participants had tested positive for the virus and 24% stated they belonged to a COVID-19 risk group for severe disease progression. Single questions within COAST yielded low perceived stress and sleep problems in our sample while showing high self-efficacy and optimism, as well as a medium level of mindfulness.

Table 1. Descriptive Statistics (*n*= 42)

Sex (n, %)	Female	18, 42.90
	Male	24, 57.10
Age (M, SD)		43.79 (10.53)
Quarantine (%)		
	At any time	26.19
	At time of study	2.38
Direct Contact with		9, 21.43

COVID-19 - patients (n, %)		
Member of Risk Group (%)		
		23.81
Positive COVID-19 Test (%)		
		2.38
Activity Scores M (SD)		
		15.46 (10.31)
Questions M (SD)*		
	Perceived Stress	3.39 (2.83)
	Perceived Self-Efficacy	6.85 (2.27)
	Sleep	1.16 (0.85)
	Mindfulness	1.63 (0.97)
	Optimism	7.23 (2.20)

Note: *Questionnaire assessments were based on single questionnaire items completed within the program while working on COAST modules. Possible ranges were 0-10, and 0-3 for sleep and mindfulness, with higher scores indicating more perceived stress, self-efficacy, lower sleep quality, greater mindful awareness.

COAST-users were representative in terms of age and sex with the overall population of first responders from the first responder organization, one of the largest urban first responder units in Switzerland, and there were no significant differences between the two populations in these variables. However, COAST-users had a higher percentage of positive COVID-19 tests compared to values from the total sample of 702 first responders provided to us by the organisation (2.4 versus 0.7%) and 26% of COAST-users reported having been in quarantine at any time while this number was at less than 1% in the overall first responder population.

User acceptance, activity, and user feedback

We found no significant correlations between user activity, i.e., number of clicks, and sociodemographic, COVID-19-, or work-related items (i.e.: previous COVID-infection, age, sex, current quarantine etc.). Perceived stress, and self-reported scores relating to module targets (self-efficacy, mindfulness, sleep quality, optimism) were also unrelated to user activity scores.

Table 2. Association of sociodemographic variables, perceived stress, and scores mapping on module target content with program activity (click count score)

Variable	Association with program activity (r, *P*)
Age	
	0.03, *P* = .57
Sex	
	0.02, *P* = .56
Quarantine (At any time)	
	0.02, *P* = .44
Direct Contact with COVID-19 - patients	
	0.13, *P* = .21
Member of Risk Group	
	0.05, *P* = .38
Perceived Stress	
	-0.18, *P* = .81
Perceived Self-Efficacy	
	-0.06, *P* = .39
Sleep	
	-0.05, *P* = .60
Mindfulness	
	0.05, *P* = .40
Optimism	
	-0.03, *P* =.55

Note: Correlation coefficients comprise Pearson correlations, Spearman correlations for the association with perceived stress, self-efficacy, and optimism scores, and point-biserial correlations for those with sex, quarantine, direct contact, sleep quality, mindfulness, and risk-group membership; correlations with positive COVID-19 test-results could not be calculated due to only one person in the group that responded to the respective questionnaires had received a positive test result

Analysis of the click-count per module yielded that the self-efficacy module was used most, accumulating to 382 clicks, followed by the mindfulness module, with 122 clicks, 103 for the sleep module, and 47 for the gratitude module. Mean activity score of all users was 15 clicks in the program (SD = 11.11) assessed over a period of 15 weeks. Activity scores ranged from 0 to 54 clicks, while the time spent on the pages was not measured. Three outliers were detected by visual analysis of the boxplot and removed from the activity scores.

On average, users were satisfied with the program, as indicated by a mean score of 21.42 (SD = 4.08)

in the Client Satisfaction Questionnaire (CSQ, range 8 to 32), representing “mild satisfaction”. Some users reported difficulties using an online format or wished for more visualization of the content. One user was concerned about confidentiality, specifically with regards to work-related answers.

Discussion

We developed an evidence-based, multi module, web-based program to increase resilience in health care workers and first responders during the COVID-19 pandemic, COAST. Here we report data from a feasibility study. COAST was actively used by 52 first responders, 7% of the overall first responder group targeted and invited during the COVID-19 pandemic. COAST use was independent of age, sex and perceived stress as well as scores mapping on module target content of the respective intervention (self-efficacy, mindfulness, sleep, optimism). First-responders who had been tested positive and those who had been quarantined were more likely to engage in the program. This may indicate that we indeed may have reached those more and directly affected by COVID-19 and potentially in need of an intervention, but decreased workload during quarantine may also have contributed. Individual users mostly engaged in the self-efficacy memory module, followed by mindfulness, sleep, and gratitude modules. Overall, first responders expressed satisfaction with the program.

The use of online technology is gaining popularity in mental healthcare and these technologies become increasingly available and affordable, hence lending themselves to implementation in the current first responder setting. Due to their busy and challenging work environment, we expected challenges to engage this population in our program. Previous studies have indeed confirmed that first responders [29] and medical personnel working in a hospital [39] may have very specific needs as well as expectations for interventions. We thus developed COAST to be easily accessible and self-paced and fit to individuals’ needs. Indeed, we found large interindividual variability in COAST use,

with number of clicks and activity low in some, but regular and high in other first responders. Interestingly, activity was independent of self-reported self-efficacy, mindfulness, sleep and optimism, as well as perceived stress. As expected, some modules were used more than others. The self-efficacy memory module was used most often. Self-efficacy may emerge as a key construct underlying risk and resilience in relation to COVID-19 given the unpredictable nature of life during the COVID-19 pandemic and lack of controllability and agency experienced by some individuals. Theoretical models [25] and numerous studies with trauma exposed individuals have found that self-efficacy is an important mechanism underlying risk and recovery among first responders and emergency personnel [e.g., 47-49]. Participants in this study may have been drawn to this module in an attempt to improve self-regulation and to experience a sense of control by recalling previous challenges and obstacles that had been overcome. Although this data does not include self-efficacy related outcomes, interest and engagement in this module may offer a promising strategy for reducing distress and maintaining wellbeing as studies have shown that perceptions of self-efficacy can be increased among healthy [50,51] and clinical populations [30, 31]. Higher levels of self-efficacy have been associated with greater problem-solving abilities [51] and a higher level of persistence as well as brain activity changes in brain regions linked to emotional regulation [52]. By instructing and supporting first responders' recall of autobiographical self-efficacy memories, such adaptive processes may have been activated and self-efficacy increased. While work in the lab supports these assumptions, processes in the field, as investigated here in the first responder population, will have to be investigated further to elucidate the precise mechanisms of action of individual modules, such as the self-efficacy module.

The second most frequently used module was mindfulness. This is in line with recent efforts and success of implementing mindfulness interventions in mental and other health workers [e.g., 53, 54]. Previous studies have reported significant effects of mindfulness programs in scalable, practical ways, including successful delivery of online mindfulness training in high-risk workplace settings

and first responders in an entirely online-based version, such as in the current study [50]. Again, we can only speculate about the mechanisms of actions. In a previous study on frontline medical workers, we found that lower activation of the arousal system, indexed by brain activation of the arousal system during an emotion regulation task, was associated with more resilience during stressful medical work later [55]. Since one demonstrated effect of mindfulness is change in gray matter concentration in several brain regions, including the locus coeruleus arousal system [56], such changes may well underlie the effects of mindfulness interventions, and could be important to the first responder populations. In other words, successful engagement in mindfulness may lead changes in brain regions that contribute to a more adaptive arousal system and enhanced well-being following mindfulness practice. We hasten to draw any further conclusions about the precise effects of our modules, however. The same applies to ranking activity in the modules. In addition to personal choice informed by module content, module choice may also reflect the graphical module position on the web layout of our program, rather than reflecting preference of individual users.

Only a subgroup of participants completed feedback via questionnaires, but this can be of use for further program development. Amongst points raised were privacy concerns, which is commonly reported in such populations [e.g., 22, 29] and should be included in future developments. Specifically, users were concerned about information they provided and that might be fed back to line managers and employers. This was not the case in our program and should be approached similarly by future programs. Our and other future programs should also take into account users' preferences in terms of graphics and design and increase and optimize graphical module features, which were rather basic in our program and could be enriched and animated in several ways, and include elements of personalization, i.e. users creating their very own character that accompanies them, guides through the modules and may encourage individual engagement.

Our sample was representative for the targeted population of first responders, but the healthcare system in Switzerland may not be comparable with other health care systems around the world and

thus not generaliseable to other healthcare professionals during the COVID-19 pandemic. Wealth of a country as well as socioeconomic differences and the gravity of the outbreak in the country have been shown to influence how the COVID-19-pandemic impact on a population [17, 18, 57]. All of our sample was currently employed, hence also limiting generalizability to health care workers and first responders from countries with lower incomes or less job stability.

Our study was not without limitations. First, while we did find significant interest in COAST and subsequent activity in the program in those signing up to it, response rate on external questionnaires (Questionnaires 1-3) that we asked participants to fill in for evaluation of the program, was low and these could therefore not be evaluated. Future programs should make module use conditional on completion of a core set of questionnaire items. Second, all questions were self-report questionnaire items and thus associated with known challenges, including retrospective response biase, social desirability [58] and affected by current mood states [59]. Further, scores reported resulted from single questions about each subject, and although these were based on full-length questionnaires their separate use is not validated. Third, the exact timing of in-program questions and their relation to user's progress in COAST could not be determined. We also did not obtain exact results on how long users spent in a given module. Results are thus preliminary and future studies will have to assess larger sample and test for controlled effects of the program that could then establish the program's effectiveness in decreasing symptoms of stress and change scores in our target processes self-efficacy, mindfulness, sleep and positive thinking. Finally, and perhaps most importantly, response rate of the overall population of first responders was 7% and thus rather low. Such challenges to engage health care workers (and indeed other groups) in e-mental health interventions during the COVID-19 pandemic have been well documented. Chen et al. [39] report reluctance of Chinese hospital staff to use available support offers. The authors adjusted their program to include staff feedback and established resting rooms and provided counsellors for face- to- face sessions. Ketelaar et al. [23] suggest using blended care to reduce attrition and boost participation and this option

should be considered for the current program. Another study from Wuhan [37] posited that difficulties with engagement might stem from issues with reduced trust and heightened sense of stigma, as well as a high workload and implemented anonymous interventions and daily reminder messages. Further suggested challenges and reasons for low participation could be low perceived need, technical problems, and unattractive channelling towards their intervention [23]. While we are not aware of any technical problems of the COAST-program, low perceived need could have contributed to low participation, as our baseline questionnaire indicated low mental health symptoms in the majority of respondents. In the future, stepwise approaches could be implemented including screening for at risk participants that will then be offered further interventions rather than a one-size fits all approach. Privacy concerns seem to be key in the target population [e.g., 29; 22; 29] and participants often requested that an online intervention should be independent from their employer. While COAST was in fact developed, run and analysed entirely independently from the employer, the program and study was announced and offered via participants' official work email.

Despite these limitations, our study has practical and clinical implications for prevention and intervention science. We reached a small, albeit significant subgroup of first responders who actively used the program and provided feedback. Advantages of such e-mental health interventions include their application and use without physical contact and their scalability, as we can reach more clients than would be possible face-to-face. These are critical features during crises, such as the current pandemic. More controlled studies on developing and adapting online-interventions tailored to preferences and needs of health care workers and first responders during the COVID-19-pandemic are needed. These could also pave the way for additional novel additions, such as just-in time interventions or blended interventions combining individual use of a self-paced intervention with subsequent individual psychotherapy for those who continue to experience stress and psychological symptoms.

Acknowledgments

We thank all first responders who used the program and took part in our study. We further thank Ute Kleim for the illustrations in the COAST program. J.M.H was supported by a stipend of the Swiss-European Mobility Programme and A. M. was supported by the Swiss National Science Foundation (P2SKP3_178107).

Authors' Contributions

JMH and BK conceived the study, TB provided the online platform, JH, NW, BK and TB developed the online modules and all authors provided feedback and support to program development, SM and UE supported study implementation and recruitment, JMH conducted the study, JMH and BK conducted data analyses, JMH and BK wrote the manuscript, all authors edited the manuscript and approved the final version.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Multimedia Appendix

Multimedia Appendix 1: Exemplary screenshot: COAST Self-efficacy module

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Supplementary Files

Multimedia Appendixes

Exemplary screenshot: COAST Self-efficacy module.
URL: http://asset.jmir.pub/assets/4b986e16e12994587bc01603a94ff55f.doc