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A stress management program in a COVID-19 Field Hospital: a proof of concept trial

Um programa de gerenciamento de estresse em um hospital de campanha COVID-19: um teste de prova de conceito

Un programa de manejo del estrés en un hospital de campaña COVID-19: una prueba de prueba de concepto

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ABSTRACT: Introduction: During the COVID-19 pandemic several cities resorted to Field Hospitals in order to expand the healthcare system capability. This strategy proved to be effective but imposed a significant challenge to healthcare workers (HW) who were exposed to a highly stressful environment in these facilities. **Objectives:** We present a stress management program implemented in a COVID-19 Field Hospital designed to reduce anxiety and stress levels and boost motivation among HW. **Methods:** We conducted a phase II open trial based on four integrative interventions groups; guided meditation - body scan, guided meditation - respiration, music medicine and therapeutic listening. Outcomes were evaluated with Visual Analogue Scales and the Spielberger State-Trait Anxiety Inventory. **Results:** A total of 441 volunteers were included in the study and without regard to the type of intervention itself, positive effect was found for all outcomes with a mean reduction of 16.75% for anxiety (reduction of 7.17 points, sd=10.20, $p<0.0001$), a reduction of 27.5% for stress (reduction of 1.23 point, sd=0.89, $p<0.0001$) and an 9.4% increase of motivation (increase of 0.72 point, sd=0.60, $p<0.0001$). **Conclusion:** We found the present stress management program designed with brief, easy to apply and low cost activities to be capable of significantly reduce anxiety, stress and enhance motivation of HW in a COVID-19 Field Hospital.

Keywords: Covid19, mental health, healthcare workers, field hospital

RESUMO: Introdução: Durante a pandemia de COVID-19 diversas cidades recorreram a Hospitais de Campanha para aumentar a capacidade do sistema de saúde. Essa estratégia foi efetiva mas impôs um desafio significativo aos profissionais da saúde (PS) expostos a um ambiente altamente estressante nesses locais. **Objetivos:** Apresentamos um programa de gerenciamento de estresse implementado em um Hospital de Campanha COVID-19 projetado para reduzir os níveis de ansiedade e estresse e aumentar a motivação entre os PS. **Métodos:** Foi realizado um ensaio aberto de fase II baseado em quatro grupos de intervenções integrativas; meditação guiada - escaneamento corporal, meditação guiada - respiração, medicina musical e escuta terapêutica. Os resultados foram avaliados com Escalas Análogas Visuais e o Inventário de Ansiedade Traço-Estado de Spielberger. **Resultados:** Um total de 441 voluntários foram incluídos no estudo e independente do tipo de intervenção em si, foi encontrado efeito positivo para todos os desfechos com redução média de

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16,75% para ansiedade (redução de 7,17 pontos, dp=10,20, p< 0,0001), redução de 27,5% para o estresse (redução de 1,23 ponto, dp=0,89, p<0,0001) e aumento de 9,4% da motivação (aumento de 0,72 ponto, dp=0,60, p<0,0001). **Conclusão:** Constatamos que o presente programa de gerenciamento de estresse elaborado com atividades breves, fáceis de aplicar e de baixo custo foi capaz de reduzir significativamente a ansiedade, o estresse e aumentar a motivação dos PS em um Hospital de Campanha COVID-19.

Palavras-chave: Covid19, saúde mental, trabalhador da saúde, hospital de campanha

RESUMEN: Introducción: Durante la pandemia del COVID-19 varias ciudades recurrieron a los Hospitales de Campaña para ampliar la capacidad del sistema de salud. Esta estrategia demostró ser efectiva pero impuso un desafío significativo para los trabajadores de la salud (TS) que estaban expuestos a un ambiente altamente estresante en estas instalaciones. **Objetivos:** Presentamos un programa de manejo del estrés implementado en un Hospital de Campaña COVID-19 diseñado para reducir los niveles de ansiedad y estrés y aumentar la motivación entre HW. **Métodos:** Realizamos un ensayo abierto de fase II basado en cuatro grupos de intervenciones integradoras; meditación guiada - exploración corporal, meditación guiada - respiración, medicina musical y escucha terapéutica. Los resultados se evaluaron con Escalas Análogas Visuales y el Inventario de Ansiedad Estado-Rasgo de Spielberger. **Resultados:** Se incluyeron en el estudio un total de 441 voluntarios y, sin importar el tipo de intervención en sí, se encontró un efecto positivo para todos los resultados con una reducción media del 16,75 % para la ansiedad (reducción de 7,17 puntos, sd=10,20, p< 0,0001), una reducción del 27,5% para el estrés (reducción de 1,23 punto, dt=0,89, p<0,0001) y un aumento de la motivación del 9,4% (aumento de 0,72 punto, dt=0,60, p<0,0001). **Conclusión:** encontramos que el presente programa de manejo del estrés diseñado con actividades breves, fáciles de aplicar y de bajo costo es capaz de reducir significativamente la ansiedad, el estrés y mejorar la motivación de HW en un hospital de campaña COVID-19.

Palabras clave: Covid19, salud mental, trabajador de la salud, hospital de campaña

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Marcelo Bruno Generoso and Pedro Shiozawa drafted the first version of the manuscript.

Marcelo Bruno Generosov, Pedro Shiozawa, Paulo Marcelo Naoum Mazaferro and Ricardo Riyoiti Uchida contributed to the study conceptualization and design.

Carla Caroline Vieira Silva, Raphael Castiglione Nascimento, Leonardo Wanderley Juliani, Renan Fernandes Cardoso, Rebecca Soares Oliveira, Danillo Alves Bastos, Isabel Marbach Pasqual and Amanda Silva Sardinha developed daily trial activities and data collection.

Pedro Shiozawa, Paulo Marcelo Naoum Mazaferro, Marsal Sanches and Ricardo Riyoiti Uchida reorganized the main contents of the paper and made critical revisions.

All authors read and approved the final manuscript.

1. Introduction

1.1 Coronavirus Disease (COVID-19) Impact on Healthcare Workers (HW)

The COVID-19 pandemic outbreak overloaded healthcare systems worldwide with a large number of infected patients in need of inpatient treatment [1]. In order to expand healthcare capability, several cities resorted to Field Hospitals installed in convention centers and stadiums designated exclusively for the treatment of COVID-19 patients. This strategy proved to be effective but imposed a significant challenge to HW who were exposed to a highly stressful environment in these facilities [2].

Published literature demonstrates that frontline HW were at higher risk to develop anxiety disorders, depressive disorders, burnout syndrome and trauma and stressor related disorders [3].

Despite growing evidence that daily medical assistance might be jeopardized by stress and related conditions and that HW should have mental health support there is still lack of instructions of how this should be done [4].

We hereby present a protocol focused on stress reduction and mental health promotion designed for HW and implemented in a Sao Paulo COVID-19 Field Hospital during the COVID-19 pandemic.

Most mental health programs implemented worldwide during the pandemic focused on psychological support for HW and not in mental health promotion and were design for general hospitals not Field Hospitals [5, 6].

2. Materials and Methods

2.1 Overview

We conducted a phase II open trial aimed to assess the effectiveness of a stress management program based on feasible interventional strategies. The program was based on four integrative intervention groups; guided meditation - body scan (GMBS) , guided meditation - respiration (GMR), music medicine (MM) and therapeutic listening (TL). The experiment was carried out at Anhembi Field Hospital with 870 beds which treated 6350 patients from April to September of 2020 in Sao Paulo, Brazil.

2.2 Recruitment

Recruitment occurred by convenience following local advertisement. We opted to include all HW who demonstrated interest in participating on the study except those presenting with severe psychiatric comorbidity or suicidal ideation who were immediately directed to treatment. For sample size prediction, we adopted an alpha level of 0.05, a power of 80%, and estimated a small effect size for all interventions.

2.3 Randomization and blinding

Volunteers were randomized into one of four different groups (GMBS, GMR, MM or TL). The chosen randomization strategy was the block randomization method performed with a randomization generator.

2.4 Assessment

Three main outcomes were evaluated using the mean difference of self reported stress, anxiety and motivation levels at baseline and immediately after the intervention. Stress and motivation were assessed by two different visual analogue scales (VAS) ranging from 0 (not stressed at all or not motivated at all) to 10 (highly stressed or highly motivated). Anxiety levels were assessed by the 6-item Spielberger State-Trait Anxiety Inventory (STAI) ranging from 20 to 80 [7, 8]. We opted for brief, reliable and quick responding instruments to reduce evaluation time considering the high demands of HW.

Data were analyzed from the full intent-to-treat sample using a repeated measures analysis of variance (ANOVA) with treatment as the between - subject factor and time as the within-subject factor. The significance level was set at $p \leq 0.05$. All analyses were performed by the statistical software Stata®13.1.

2.5 Experimental Protocol

All interventions consisted on 30 minutes single section group activities with five to eight participants led by trained psychiatry residents and carried out inside the isolation area with proper precautions to minimize biohazard risk.

Guided Meditation - was based on mindfulness exercises intended to reduce stress and improve wellbeing by altering brain regions related to acceptance, emotional processing, emotional regulation, perspective taking and compassion. [9] We employed two different 12 minutes guided

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meditation audio recordings to help participants bring their attention to the present moment either by focusing on body scan in which participants were instructed to focus their attention on specific body areas (GMBS) or on their respiration movements (GMR). At the end of each session participants were encouraged to share with each other what they felt or thought.

Music Medicine - listening to pleasant music improves well being by altering emotional, autonomic and cognitive processing [10]. Music medicine may be defined as the use of music in healthcare context for example as listening to music before or during a procedure and incipient data indicate that music may mitigate negative emotions at short term [11]. Participants were instructed to pay attention to their feelings and thoughts while listening the music and them share with each other what they felt or thought. Songs were randomly selected from a list of five jazz tracks and five blues tracks.

Therapeutic Listening - attentive listening to one's concerns adopting a respectful and empathic attitude with interest to help may be considered therapeutic as it allows the expression of thoughts and feelings and by itself may be a great instrument to ease one's suffering [12]. We asked participants to share their ongoing concerns and encouraged other participants to share their individual coping strategies in similar situations therefore reinforcing inter participants support in a group setting.

3. Ethics

Prior to the study, informed consent was obtained from all volunteers. The study was approved by the Institutional Review Board of the Department of Public Health of the City of Sao Paulo and Brazil´s National Research Ethics Committee (registration number: CAAE 31430620.6.3001.0086). All methods were carried out in accordance with relevant guidelines and regulations.

4. Results

4.1 Overview

A total of 441 volunteers were included in the present study, with a mean age of 35 years (sd=8.77 from 19 to 59) and 80% (n=354) were female. The mean time of work at the field hospital was 7.30 weeks (sd=3.9) and each healthcare professional was responsible in average for 13 patients (sd= 23). The mean baseline scores were as follows: for stress 4.47 (sd=2.43), anxiety 42.8 (sd 10.70) and motivation 7.66 (sd 1.79). Regarding the different interventional groups, no imbalance for main

outcomes variables were found at baseline. Data is summarized in Table 1.

4.2 Main outcomes

Measurement of outcomes was done using continuous variables in order to increase the power of the findings through compatible statistical tests (ANOVA) for comparison between different interventions. The testing for each intervention alone was done through post hoc analysis with correction for multiple comparisons using the Bonferroni method. Without regard to the type of intervention itself, we found positive effect for every outcome variable (Figure 1) with a mean reduction of 16.75% in anxiety (score reduction of 7.17 points, sd=10.20, $p<0.0001$), a reduction of 27.5% in stress (VAS reduction of 1.23, sd=0.89, $p<0.0001$) and an 9.4% increase in motivation (VAS increase of 0.72, sd=0.60, $p<0.0001$).

In post hoc analysis, no between group differences were found for the interventions individually for neither anxiety ($p=0.966$), stress ($p=0.587$) nor motivation ($p=0.948$). Results are presented in Figure 2.

4.3 Effect estimation and cofounders

We choose to estimate the overall effect sizes not disregarding the open-label nature of the present trial by calculating standardized mean differences (Hedges g). We found a small to moderate effect for each intervention nonetheless the uncontrolled nature of the study regarding stress amelioration (Hedges g=0.56 95% CI 0.42 - 0.69), anxiety improvement (Hedges g= 0.67 95% CI 0.56 - 0.83) and increase in motivation (Hedges g=0.43 95% CI 0.56 - 0.30). No significant statistical difference was observed between the different intervention protocols nor the musical genre used for the music medicine group ($p=0.765$).
Apropos of possible cofounders, we evaluated whether clinical and demographical data were related to clinical amelioration. We found no significant interaction between clinical outcomes and baseline assessments.

5. Discussion

We present positive preliminary results of a stress management program based on four integrative interventions in a COVID-19 Field Hospital. The implementation was advantageous for its simplicity and no major adjustments were required in the hospital daily routine. In truth, the

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presence of mental health awareness was positively grasped by healthcare workers which came across the program as a kind tool in a burdensome routine.

An important feature of or protocol was to combine different approaches not only to reduce stress but also reduce anxiety and enhance motivation. Our results showed that brief, easy to apply and low cost activities are capable of significantly contributing to the wellbeing of HW even in extreme times such as the COVID-19 pandemic.

A common ground of all interventions was that they were performed in a group setting therefore promoting peer support and the possibility to share thoughts and feelings which may have contributed to the fact that all strategies were indistinctly related to clinical amelioration of symptoms for both anxiety and stress reduction as well as for increasing motivation. This finding may allow administrators to tailor the strategy that best suits their healthcare settings.

6. Conclusion

We found the present stress management program to be a feasible approach for coping with stress related conditions in a COVID-19 Field Hospital. Results showed that all group activities were effective in reducing stress and anxiety levels and enhancing motivation of HW. It is our belief that similar initiatives may be a worthwhile endeavor for hospital administrators also after the pandemic.

7. Acknowledgments

Albeit the exciting results, this study should be interpreted in the light of some limitations. In spite of our broad recruitment strategy, we had a relatively small sample size as part of this open-label study. The lack of a control group or waiting list, the attention provided by researchers, mutual support and time away from work may have overestimated the clinical effect of the interventional protocol. Another issue lays upon the absence of a follow-up period to clarify the sustainability of the presented positive effects. All in all, major limitations followed a never-before-seen clinical scenario which inflicted adaptations in medical assistance.

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Table 1: Overall demographic and clinical scenario

Continuous Variables	**Mean**	**Standar Deviation (SD)**
Age	35.07	8.77
Number of patients under care	13.17	23.08
Work Time (in weeks)	7.30	3.93
Stress Level (VAS)	4.47	2.43
Anxiety Level (STAI)	42.80	10.70
Motivation Level (VAS)	7.66	1.79
Categorical variables	**N**	**%**
Gender (female)	354	80.27
Administrative staff	75	17.00
Medical and paramedical staff	366	82.99
Participants in Therapeutic Listening	195	44.21
Participants in Music Medicine	71	16.09
Participants in Guided Meditation - Body Scan	83	18.82
Participants in Guided Meditation - Respiration	92	20.86

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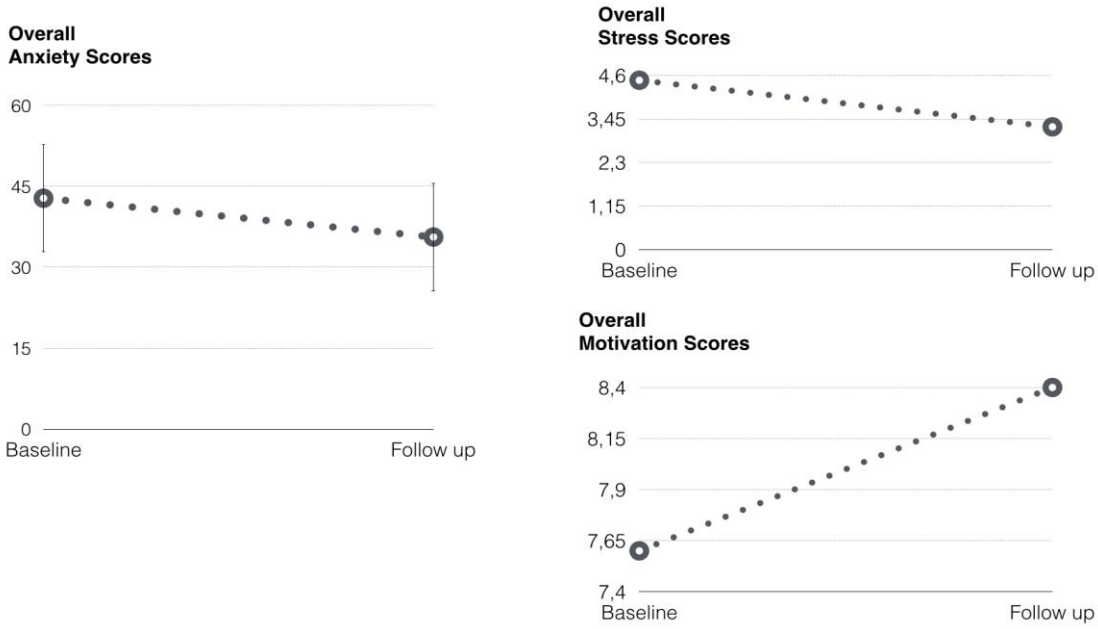

Figure 1: Overall changes between baseline and follow-up scores

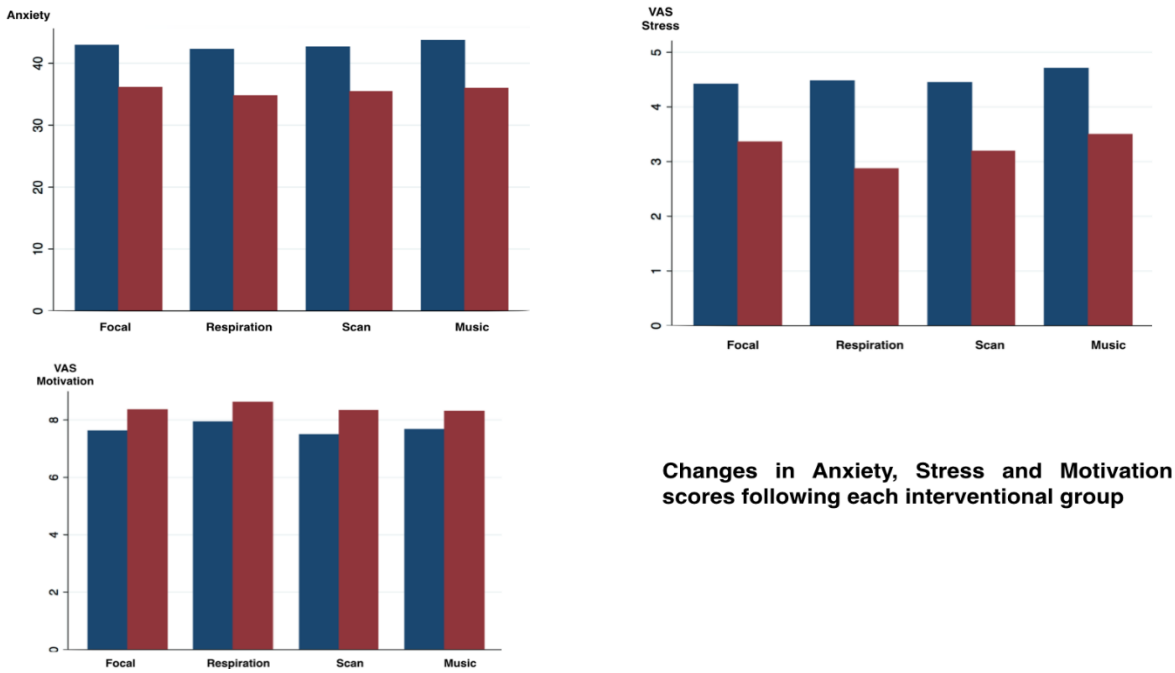

Figure 2: Overall changes in anxiety, stress and motivation scores following each interventional group

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