Trends
in Psychiatry and Psychotherapy

JOURNAL ARTICLE PRE-PROOF
(as accepted)

Original Article

Which factors predict the improvement perception after a Single-Session Intervention on frontline professionals during a crisis situation?

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http://doi.org/10.47626/2237-6089-2025-1154

Original submitted Date: 23-Nov-2024

Accepted Date: 17-Oct-2025

Which factors predict the improvement perception after a single-session intervention on frontline professionals during a crisis situation?

Short Title: factors of SSI improvement perception

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Abstract

Introduction: The COVID-19 pandemic has significantly impacted mental health, particularly among frontline professionals. In response to the associated social isolation, short-term and remote service alternatives became essential. This study aimed to investigate the predictors of perceived improvement following the single session intervention with enhanced psychoeducation (SSI-EP), which included support videos, for frontline professionals during the COVID-19 pandemic.

Methods: This study analyzed data from a large trial involving frontline workers conducted from April 2020 to December 2021. All participants were randomized to receive the SSI-EP with videos and were included in the analysis.

Results: The final sample included 709 participants – 82.8 % health-care professionals and 87.8 % women. One month after the intervention, 558 individuals (78.7 %) showed improved emotional symptoms. Greater improvement was associated with viewing more intervention videos and self-medication. In contrast, excessive carbohydrate and fat intake was linked to poorer outcomes.

Conclusion: This study underscores the significance of the SSI and the role of psychoeducational videos in enhancing participants' perceptions of improvement. Further research is necessary to examine these elements and determine which individuals might gain from this cost-effective, scalable intervention.

Introduction

The COVID-19 pandemic created a global health crisis, significantly affecting daily life. Concerns arose regarding the exacerbation of mental disorders, particularly among groups heavily exposed to stressors, such as health professionals. During such crises, interventions like the single-session intervention (SSI) present viable alternatives for providing initial psychological care. Typically, SSIs are part of structured programs designed to comprise just one meeting. These interventions aim to be therapeutic and enhance access to care. The effectiveness and significance of SSI have been increasingly supported by evidence, finding application during the pandemic, particularly through remote care [1–3].

Despite the increasing investment in SSIs and evidence supporting their effectiveness, a gap persists in the literature concerning predictors of improvement following these interventions [4]. Some authors consider SSI a form of single-session therapy. In general, psychotherapy interventions recognize that different patients may benefit from various methods, and identifying the patient profiles that respond well to each technique enables the recommendation of the most suitable approach for each individual [5–7]. Certain predictors are linked to optimal stages and positive results in psychotherapeutic interventions [7,8]. In young people, a strong initial response to SSI predicts sustained improvement [3,9]. Regarding emotional distress among frontline workers, further studies are required to evaluate the efficacy of SSIs. Thus, researching predictors of response to these interventions can enhance our understanding of whom this technique benefits, enabling a more personalized and evidence-based practice [6]. With this understanding, there is potential to expand the use of SSI with Enhanced Psychoeducation (SSI-EP) beyond crises like the COVID-19 pandemic.

Psychoeducation is a well-established technique developed by clinical psychiatrists in the 1970s. It aims to enhance patient participation and adherence to treatment by increasing awareness of their psychopathological condition**.**Despite its importance, Psychoeducation is often employed in a simplified, informational manner during

consultations [10,11]. This technique is highly flexible and adaptable, including online applications [12,13]. As a form of structured psychoeducational intervention (SSI), Psychoeducation provides patients with information about their symptoms and treatment. This knowledge encourages behavioral changes and promotes active patient engagement in their treatment. This intervention significantly reduces symptoms, decreases relapses and hospitalizations, fosters positive attitudes, improves treatment adherence, and shortens hospital stays for various mental disorders. Moreover, it is considered an accessible and cost-effective tool.

Given this context, the Hospital de Clínicas de Porto Alegre (HCPA) and the Brazilian Ministry of Health developed the TelePSI Project. This initiative aims to provide telehealth services using various psychotherapeutic approaches to support health professionals, teachers, and essential service workers during the pandemic in Brazil. A detailed description of the TelePSI Project has been published elsewhere [14]. Implemented nationally, TelePSI was rapidly developed from the onset of the lockdown and has provided care to over 3,000 individuals.

Many new mental health strategies have emerged during the pandemic; however, there is a lack of data regarding the effect of digital tools on mental health research and care [15–17]. Thus, it has become a priority to study ways to provide psychological assistance quickly and economically. Despite the exponential increase in telehealth during the pandemic [15], data on the use of these digital tools for research and assistance remain insufficient. This study aims to investigate Enhanced Psychoeducation supported by videos, conducted online, which can be considered a digital intervention tool in the context of remote care and the pandemic. There is a need for data on its impact, effectiveness, and the specific populations for which it is suitable.

Methods

TelePSI Project

The TelePSI Project, initiated by HCPA in collaboration with the Brazilian Ministry of Health, aimed to provide online mental health care to healthcare professionals engaged in essential services during the COVID-19 pandemic. TelePSI assembled a team of professionals to develop teleservice protocols, training strategies, and a research initiative to support Brazilian National Health System (SUS) staff and other essential service workers on a national scale. These services commenced in April

2020. TelePSI adopted four telepsychotherapeutic protocols: a) Enhanced Psychoeducation (SSI-EP), b) Enhanced Psychoeducation with supplementary videos (SSI-EP with videos), c) Ultra-brief Cognitive-Behavioral Psychotherapy (TCC) consisting of four sessions, and d) Ultra-brief Interpersonal Psychotherapy (IPT) also comprising four sessions.

Enhanced Telepsychoeducation, an innovative strategy proposed by TelePSI, focuses on addressing the emotional symptoms identified during the initial assessment with participants. The approach involves suggesting habit changes based on the personal identification of risk and protective factors related to physical, emotional, psychological, and overall well-being aspects. Participants who received Enhanced Telepsychoeducation, supplemented by supporting videos, were provided with these materials from TelePSI over a period of 4 weeks. This article will specifically analyze the SSI-EP participants who received support videos..

Enhanced psychoeducation with support videos

The SSI-EP modality with reinforcement videos involves a structured psychoeducation session lasting approximately 50 to 60 minutes, followed by the distribution of videos over 4 weeks. This session is conducted online using the Google Meet platform, through the HCPA's institutional license. During the session, the therapist listens empathetically to the patient, aiming to identify their needs and the primary areas of concern in mental health. This assessment guides the selection of videos to be sent later [18–20].

The project team developed videos that were short and focused on 16 mental health topics: 1) How to protect yourself from SARS-CoV-2, 2) Fear of contagion, 3) Normal anxiety vs. excessive anxiety, 4) Normal sadness vs. depression, 5) Anger vs. irritability, 6) Burnout, 7) Stress and acute reactions to stress, 8) Sleep hygiene, 9) Healthy eating and mental health, 10) Exercise and mental health, 11) Excessive consumption of alcohol and drugs, 12) Excessive exposure to the news, 13) Excessive use of social media, 14) Taking care of children, 15) Taking care of the elderly, and 16) Social support [21]. Therapists select the videos they consider most useful for each patient and maintain contact throughout the 4 weeks by sending these videos via WhatsApp messages twice a week. The videos are grounded in various psychotherapeutic approaches and focus on psychoeducation and habit change, with

the aim of improving the participant's quality of life. An online follow-up interview was conducted one month later.

Data collection

The data collected by the TelePSI Project were analyzed to evaluate participants randomized to the SSI-EP, which included video components. The study aimed to identify predictors of perceived improvement among these participants, who exhibited a range of symptoms of depression, anxiety, and irritability from mild to severe. The current study does not focus on distinguishing between those who improved and those who did not; instead, it seeks to identify factors that may contribute to a better response.

Follow-up assessments, including the PROMIS® (Patient Reported Outcomes Measurement Information System) scales and additional questions on lifestyle, exposure, and COVID-19 risks, were conducted online through self-reporting forms at one-month, three-month, and six-month intervals. In the present study, we use data from the one-month interval to identify the factors associated with the greatest extent of self-reported improvement. PROMIS is a set of person-centered measures designed to assess and monitor physical, mental, and social health in adults and children.

Further details about the Project can be found in the main article [14,20]. The TelePSI umbrella project was submitted to the Research Ethics Committee (CEP) under CAAE: 30608420.5.0000.5327 and is registered with the GPPG HCPA as 2020-0213. Subsequently, it was also submitted to the National Research Ethics Commission (CONEP). All participants provided their informed consent by signing the Informed Consent Form before inclusion in TelePSI.

Sample of the present study

The sample will consist of participants selected for the SSI-EP arm, with reinforcement from the TelePSI Project videos. Selection criteria were aligned with those used in the TelePSI Project.

a) Inclusion criteria: Participants included doctors, biomedical doctors, nurses, nursing technicians, physiotherapists, speech therapists, nutritionists, pharmacists, health students, teachers, and essential service professionals (e.g., drivers, delivery personnel, police officers, garbage collectors) whose roles could not cease during the

pandemic. These individuals signed up for TelePSI between April 2020 and December 2021, were selected, and participated in the EP intervention with video reinforcement.

b) Exclusion criteria: Participants were excluded if they were unable to answer the questionnaires or were at risk of suicide or hetero-aggression requiring immediate evaluation in an urgent or emergency service.

In the prepared analysis, variables previously chosen and collected by the TelePSI Project were included. These variables were gathered through project questionnaires employing scales and self-reports. Given that this study included individuals with varying symptoms at baseline, the evaluated outcome was participants' perception of improvement. The independent variables were categorized into three groups: sociodemographic factors, behavioral and lifestyle factors during the pandemic, and intervention-related factors, collected at two time points (baseline and one-month later).

1) *Sociodemographic and clinical factors* covered age, gender, whether the individual is a health professional, symptoms at initial assessment, COVID exposure, prior mental health treatment, medication use, and suicidal ideation.

2) *Behavioral and lifestyle factors during the pandemic* encompassed activities such as watching videos on YouTube, meditating, praying, writing, spending time with friends and family online, engaging in physical exercise, playing musical instruments, listening to music, spending time with pets, playing video games, reading books, participating in artistic activities, playing board games, and dietary habits including eating healthily, consuming carbohydrates, drinking soda, consuming alcohol, smoking, using marijuana and other drugs, self-medicating, watching excessive television, arguing on social media, constantly watching news online, and experiencing poor sleep quality.

3) *Factors related to the intervention* included the number of videos watched, absences from work, and satisfaction with the treatment.

Statistical analysis

Sample characteristics were described using absolute and relative frequencies for categorical variables. For continuous variables, we provided mean and standard deviation, as well as median and range (minimum to maximum). Participants exhibited varying PROMIS scores at baseline, ranging from mild to severe. Consequently, we assessed self-reported perception of improvement, collected one month after the

single session, as the outcome measure. The perception of improvement scale included five levels: much worse, moderately worse, slightly worse, the same, slightly better, moderately better, and much better. Given the small number of participants who remained the same or reported worse outcomes, we dichotomized the outcome into “improvement in symptoms” (71%) and “same/worse symptoms” (29%) based on the patient’s perception.

Following the application of LASSO (Least Absolute Shrinkage and Selection Operator) regression (to evaluate subjective treatment response as a binary outcome after treatment, this method was selected due to the study’s large number of predictors. LASSO enables variable selection that mitigates multicollinearity issues, resulting in a simpler and more interpretable model. The optimal lambda value, serving as the penalty parameter, was determined through 10-fold cross-validation, utilizing deviance as the cost function. Variables with non-zero coefficients were subsequently assessed for additional reporting. The coefficients were exponentiated and presented as odds ratios, accompanied by 95% confidence intervals.

Analyses were performed using the R programming language (version 4.2). The *glmnet* package (version 4.1) facilitated the LASSO regression analysis.

Results

The sample randomized to receive SSI-EP with videos consisted of 1,196 individuals. Of these, 100 participants (9%) were excluded due to being at risk of suicide as identified during the initial assessment. These individuals received a different intervention before accessing SSI-EP with psychiatric care, which included up to three consultations.” Additionally, 387 subjects (35.3%) were excluded due to missing outcome data, resulting in a final study sample of 709 participants.

Among the participants included in the study, the majority were female, comprising 621 individuals (87.8%), with a mean age of 37.7 years. Of the entire sample, 587 individuals (82.8%) were health professionals, 67 (9.4%) were teachers, and 55 (7.7%) worked in essential services. Table 1 provides the sociodemographic data for the evaluated population.

It was observed that 558 participants (78.7%) reported improved symptoms after one month of intervention. Multiple regression analysis identified several factors associated with these outcomes. Positively associated factors included the number of

videos watched by participants (OR 1.4, 95% CI [1.29-1.54]; p<0.05) and the self-medication (OR 2.2, 95% CI [1.08-5.03]; p<0.05). The wide confidence interval for self-medication may be attributed to the low prevalence of this behavior within the data set. Conversely, excessive consumption of carbohydrates and fats was negatively associated with outcomes (OR 0.6, 95% CI [0.38-0.95]; p<0.05), as illustrated in Figure 1. Given the significant association between video viewing and symptom improvement, we decided to further investigate which specific videos were considered most helpful by participants.

After one month, participants were asked which videos they found most helpful. The preferred videos are listed in Table 2. The video most frequently cited – by 127 participants (20%) – explained the difference between normal and excessive anxiety. The video on sleep hygiene ranked second, with 73 citations (11.5%). Additionally, 94 participants (14.8%) reported that all the videos were very important.

Table 1. Descriptive statistics of sociodemographic and clinical variables of study participants (*n* = 709)

Variables	Overall (*n* = 709)
Sex	
Female	621 (87.8%)
Age	
Mean (SD)	37.7 (10.1)
Median [Min, Max]	37.0 [19.0, 72.0]
Profession	
Health Professional	587 (82.8%)
Teacher	67 (9.4%)
Essential Services*	55 (7.7%)
Number of videos watched (follow-up)	
Mean (SD)	5.68 (2.31)
Median [Min, Max]	6.00 [1.00, 12.0]
Number of absences from work	
Mean (SD)	2.0 (5.70)
Median [Min, Max]	0 [0, 60.0]
Perceived improvement	
About the same or worse	151 (21.2%)
Better	558 (78.7.%)

SD = Standard deviation. Mi

* Professionals with jobs that could not stop during the pandemic, such as drivers, delivery men, police officers, and garbage collectors.

Table 2. Most helpful videos according to patients' perception (*n* = 635)

Videos	**Overall (*n* = 635)**
Normal and excessive anxiety	127 (20%)
Sleep hygiene	73 (11.5%)
Physical exercise	38 (6%)
Sadness and Depression	38 (6%)
Anger and Irritability	36 (5.7%)
Stress and stress reaction	30 (4.7%)
Burnout	28 (4.4%)
Healthy eating	28 (4.4%)
Taking care of children	19 (3%)
Fear of contagion	16 (2,5%)
Social support	14 (2.2%)
How to protect yourself from COVID-19	13 (2%)
Excessive exposure to the news	5 (0,8%)
Excessive use of social media	4 (0.6%)
Use of alcohol and drugs	4 (0.6%)
Caring for the Elderly	2 (0.3%
All videos	94 (14.8%)
None	66 (10.4%)
Missing	74 (10.4%)

Figure 1. Factors associated with perception of improvement

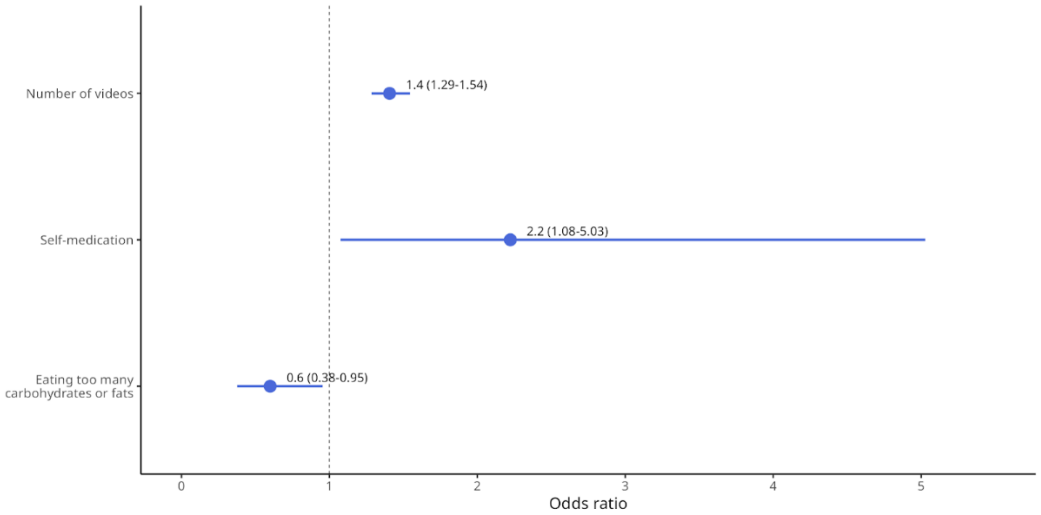

Figure 1. Odds ratio of statistically significant factors associated with post-treatment perception of improvement in the single-session intervention on frontline professionals. The dashed line indicates OR=1 (no effect size), while OR>1 suggests higher levels of post-treatment self-perceived improvement and, OR<1, lower levels of self-perceived improvement.

Figure 1. Factors associated with perception of improvement
Figure 1. Odds ratio of statistically significant factors associated with post-treatment perception of improvement in the single-session intervention on frontline professionals. The dashed line indicates OR=1 (no effect size), while OR>1 suggests higher levels of post-treatment self-perceived improvement and, OR<1, lower levels of self-perceived improvement.

Discussion

Most participants randomized to SSI-EP with videos reported improved well-being after one month of reassessment. This corroborates the findings of the Project's main article [14, 20]. Additionally, the literature increasingly supports the efficacy and significance of brief SSIs in treating mental health issues [1–3, 22]. Access to mental health care during a crisis was likely crucial for professionals on the front lines experiencing emotional distress. It provided a space for listening, validation, psychoeducation on symptoms, and encouraging habit change.

Individuals who watched more videos were more likely to report improvement, indicating that the number of videos viewed was associated with perceived improvement during reassessment. Previous studies suggest that including tasks that draw attention and engage patients – such as developing decision-making scenario

games or incorporating videos – can enhance engagement and potentially improve intervention outcomes [12]. The videos may have contributed to improvements in SSIs and could be linked to better psychoeducation outcomes. Although a causal relationship cannot be definitively established, there is a positive association.

We hypothesize either that: a) individuals who benefited more from the single psychoeducation session were more motivated and engaged, leading them to watch more videos and subsequently feel better by the end of the month, or b) watching more videos positively influenced their perception of improvement. The videos provided were related to themes addressed in the SSI-EP and tailored to patients' needs. This strategy likely enhanced participant engagement with the TelePSI Project, as contact was made twice weekly via WhatsApp for 4 weeks. Continuously receiving videos may have contributed to participants feeling cared for beyond the single session, thereby amplifying the effects of psychoeducation.

The video, regarded by most participants as the most important, focused on anxiety symptoms and educated viewers on the distinctions between normal and pathological anxiety. This result aligns with observations of high anxiety symptom prevalence during the pandemic [23]. Consequently, participants may have particularly appreciated this video, as it assisted in managing anxiety symptoms during the pandemic.

Factors influencing the patient's perception of improvement included self-medication and high consumption of carbohydrates and fats. Interestingly, self-medication emerged as a predictor of improvement in emotional symptoms. During the pandemic, the prevalence of self-medication increased significantly [24,25]. We believe that the perceived improvement does not result from the use of medication itself, especially since this practice is discouraged and can pose risks to the individual, but rather from the participants' recognition of symptoms. We can also hypothesize that this could be a proactive effort to alleviate suffering, albeit without professional guidance. Consequently, when these individuals were more concerned about improving in some way and engaged with the Project, they may have felt more motivated to seek assistance and committed to change. It is also possible that participants who had self-medicated benefited more from the intervention, since the single session provided psychoeducation on the risks associated with the use of over-the-counter medications, discouraging such use and advising them to seek specialized care. This awareness

likely discouraged self-medication and embolded the adoption of healthier alternative coping strategies.

A diet high in carbohydrates and fats was linked to poorer outcomes in psychoeducation. During the pandemic, dietary patterns of the general population deteriorated, especially during periods of confinement [26]. These patients may have experienced more severe symptoms, as such symptoms correlate not only with an unhealthier lifestyle but also with increased depression and anxiety. Stressful situations often heighten the perceived “need” to consume foods rich in fats and sugars [27]. Moreover, emotional suffering may lead to “Emotional Eating,” where individuals seek specific foods in an attempt to manage negative emotions, which is an ineffective strategy [28]. Consequently, these participants may have perceived less improvement. We hypothesize that these patients might be less inclined to adopt healthier, more active coping strategies and may display more passive behaviors, such as eating, to manage emotional symptoms.

This study has several limitations. Firstly, there was a 35% attrition rate during the follow-up, despite efforts to contact participants through cell phone messages, phone calls, and emails. This rate is comparable to those observed in other studies conducted during the pandemic. It remains unclear whether non-respondents experienced improvement in their emotional symptoms or if they did not benefit from the intervention and consequently avoided subsequent questionnaires. Additionally, the initial assessments occurred at varied points during the pandemic, characterized by fluctuations in case numbers. This variability could have influenced symptom severity based on the specific phase of the crisis. Furthermore, some data were collected through participant self-reports, which may pose a limitation as they reflect individual perspectives during a crisis period. Another notable limitation is the absence of a control group without intervention. The potential effect of time alone on symptom reduction cannot be ruled out. However, including a non-intervention group during a crisis period raises ethical concerns.

Despite some limitations, our study highlighted the significant impact of Enhanced Psychoeducation on most participants and enabled us to identify factors linked to the outcomes. This intervention shows considerable promise and paves the way for further exploration of digital strategies in managing emotional symptoms. By understanding the profiles of participants who respond most effectively, we can develop tailored intervention strategies for various populations and contexts.

Conclusion

The new TelePSI proposal, which integrates online SSI grounded in psychoeducation with the delivery of support videos, has demonstrated effectiveness. As observed in the main article, a significant proportion of participants showed improvement. In this study, we aim to analyze predictions related to participants' improvements, based on their perceptions over a 1-month period. Notably, participants' perceptions of improvement align with data from symptom scales and highlight factors such as video support as influential. This finding underscores the importance of further exploring digital interventions, which can provide broad access and maintain low implementation costs.

By evaluating these factors, we can gain a deeper understanding of this new psychoeducation model, which presents a promising alternative for assisting individuals during crises, such as the COVID-19 pandemic. We believe that this approach can facilitate the personalization and adaptation of psychotherapeutic strategies. Enhanced psychoeducation is an effective, low-cost method for alleviating symptoms and offers the capability to provide remote services across different locations, particularly in large countries like Brazil. However, this study does not establish a cause-effect relationship between these predictors and outcomes. Further research is needed to compare its effectiveness with other intervention strategies. Additionally, the application of this model should be explored beyond the context of the pandemic and social isolation.

Ethical Compliance: All procedures performed in this study involving human participants were by the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Conflict of Interest: The authors declare that they have no affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript. The authors declare that they have no competing interests.

Funding: This study was funded by the Brazilian Ministry of Health (TED no. 16/2020) and financed in part by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Finance Code 001).

Author contributions: CRediT TaxonomyAna AcheCRediT contribution not specifiedBruno Braga MontezanoData curation-Equal, Formal analysis-EqualBruno Paz MosqueiroWriting - review & editing-SupportingMarco Antonio CaldierароSupervision-Equal, Writing - original draft-Equal, Writing - review & editing-EqualLucas SpanembergCRediT contribution not specifiedGiovanni Abrahao Salum Junior Writing - review & editing-EqualMarcelo P. FleckSupervision-Equal, Writing - review & editing-Equal

Handling Editor: Dr. Bianca W. de Aguiar

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