



Effectiveness of online psychosocial interventions for reducing depression, anxiety, and stress: a quasi-experimental study

Efetividade de intervenções psicossociais online para a redução de depressão, ansiedade e estresse: estudo quase-experimental

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ABSTRACT

This study aimed to evaluate the effectiveness of online group psychosocial therapies in reducing symptoms of depression, anxiety, and stress during the COVID-19 pandemic. It was a quasi-experimental study, with the DASS-21 scale applied to participants of therapeutic groups (n=66) at two time points: pre- and post-therapies. By using the paired sample t-test, a comparison of the means of the scores found was made. The results indicated a reduction in symptoms with statistically significant differences between the means, considering $p < 0.01$, and effect sizes ranging from small (0.20-0.49) to medium (0.50-0.80). The differences found suggest the effectiveness of online group psychosocial therapies as strategies for well-being, psychosocial support, matrix support, and expressive spaces in coping with the pandemic context, which can be replicated in other contexts and public health services.

Keywords: Mental health. COVID-19. Psychosocial Support Systems. e-Therapies.

RESUMO

Este estudo teve por objetivo avaliar a efetividade de terapias psicossociais de grupo online na redução de sintomas de depressão, ansiedade e estresse durante a pandemia da COVID-19. Trata-se de estudo de quase-experimental, com aplicação da escala DASS-21 aos participantes de grupos terapêuticos (n=66), em dois momentos: pré e pós-terapias. As médias dos escores encontradas foram comparadas através do Teste t para amostras pareadas. Os resultados indicaram redução dos sintomas com diferenças estatisticamente significativas entre as médias, considerando $p < 0,01$ e tamanhos de efeito que variaram de pequeno (0,20-0,49) a médio (0,50-0,80). As diferenças encontradas sugerem efetividade das terapias psicossociais de grupo online como estratégias de bem-estar, apoio psicossocial, matricial e espaços expressivos no enfrentamento do contexto pandêmico, podendo ser replicadas em outros contextos e nos serviços de saúde pública.

Palavras-chave: Saúde mental. Covid-19. Sistemas de Apoio psicossocial. e-Terapias.

INTRODUCTION

The COVID-19 pandemic has harmed mental health and psychological well-being globally. Population-based studies across various countries have reported mental health impacts, showing a high prevalence of anxiety, depression, stress, and changes in psychological well-being. Populations identified as being at greater vulnerability included women, students, non-white ethnicities, single individuals, the unemployed, and those at higher risk of infection¹⁷.

These early-pandemic studies highlighted the need for online psychosocial interventions to alleviate psychological distress. The Pan American Health Organization (PAHO) recommended the development of Mental Health and Psychosocial Support (MHPSS) strategies by health professionals, not necessarily psychologists, working in public health services and community structures. The main goal was to reduce the psychological suffering of people affected directly or indirectly by COVID-19⁸.

In contexts of highly contagious disease outbreaks, psychosocial interventions that combine teaching coping strategies, relaxation techniques, cognitive-behavioral approaches, and spiritual techniques have shown positive effects on the health of various groups, including healthcare workers. These effects included promoting well-being and resilience, reducing psychological stress in children and adolescents, and increasing the sense of social commitment⁹⁻¹⁰.

A systematic review of 59 studies on the impact of the early stages of the COVID-19 pandemic on the mental health of healthcare professionals identified six studies describing psychosocial intervention implementations with no analysis of their effects. The authors pointed out the need to design and evaluate such actions to generate more evidence on these interventions¹¹. In hospital settings, the analysis of social support, whether in-person or online, showed improvements in coping mechanisms for

stress, sleep-related symptoms, depression, and anxiety, both for COVID-19-positive patients and for medical teams caring for infected patients¹²⁻¹³.

In general, the remote format of MHPSS strategies, especially for short- or medium-term online psychological support, results in improved connection and communication during social restriction periods, overcoming geographical boundaries. It also facilitates the sharing of experiences, serving as a way to alleviate fear and anxiety in dealing with this pandemic¹⁴⁻¹⁵.

Analysis of data from other studies, as the pandemic continued, showed the online environment to be promising for MHPSS interventions in various contexts. Individual and psychological care examples include: in Spain, an app-based intervention showed moderate symptom reduction for depression among participants¹⁶; in Germany, online psychotherapeutic interventions compared to face-to-face psychotherapy proved to be a useful tool, though not recommended as monotherapy¹⁷; and self-guided cognitive-behavioral therapies via readings and internet access links also showed a small but significant reduction in depression and anxiety symptoms in adults in Australia and the United Kingdom¹⁸. A narrative literature review analyzed six studies on Virtual Reality technology for individuals with mental disorders, revealing its effectiveness in improving users' sense of assistance and psychological presence during the pandemic¹⁹.

Less frequently, online group interventions were evaluated during the pandemic. In Greece, an online group positive psychological intervention effectively increased resilience, understanding of others' perspectives, positive emotion levels, and reduced negative emotions, with significant effects persisting post-intervention²⁰. In Brazil, an online psychoeducation group led by a nurse and a psychologist for university students offered opportunities to improve self-awareness, emotional management, interpersonal relationships, empathy, and stress reduction. The remote setting was deemed

comfortable for shy individuals or those who find face-to-face interactions challenging. Participants noted the lack of physical contact and potential academic overload as limiting factors, affecting the availability of self-care.

A systematic review of online group psychological interventions analyzed 24 articles from different countries and target audiences, showing improvements in psychological resources (resilience, empathy, life satisfaction, positive aspects) and reductions in pandemic-defined risk factors. Additionally, group interventions with participants having organic diseases showed decreases in pain, fatigue, and sleep disorders, and a reduction in psychopathological symptoms in patients with systemic sclerosis. Among the issues raised by the authors were questions about the adequacy and effectiveness of specific procedures for different population characteristics, the role of specific and nonspecific factors in comparing online and face-to-face groups, and the need for more detailed descriptions of intervention processes. Nonetheless, the results were encouraging for providing scientific evidence on the efficacy of online group interventions compared to face-to-face interventions²².

A meta-analysis of 10 studies on online psychological interventions with students from 7 American, 2 Asian, and 1 African universities found better efficacy in reducing stress and depression symptoms, especially in positive psychological interventions. The efficacy was maintained in follow-up assessments for depression symptoms, but not for anxiety. Due to high heterogeneity in the included studies, the authors suggest new studies should have greater control over variables such as trial setting, participant characteristics, outcome measures, ways of delivering psychosocial interventions, and trial procedures, as well as control group followup²³.

Another systematic review and meta-analysis of 19 randomized clinical trials on multiple psychosocial interventions during the COVID-19 pandemic found greater efficacy in reducing symptoms of depression and insomnia,

and less for symptoms of anxiety and stress. This study also referred to the heterogeneity of the studies as a limiting factor and pointed out another factor related to the limited number of articles available that met their inclusion criteria. According to the authors, many studies did not follow up on the effects of interventions or did not aim for data on the control group, making it difficult to determine the efficacy of the internet in psychosocial interventions for certain mental health problems²⁴.

It is evident that most interventions are psychological in nature, conducted individually with a behavioral approach^{16-18, 22-23}. Additionally, some were guided by therapists or self-guided through apps^{19, 24}. Regarding efficacy, they presented, among other benefits already mentioned, control of depression, anxiety, and stress²⁵⁻²⁷. Thus, the pandemic context has expanded and stimulated scientific research and the creation of digital tools for healthcare promotion. However, there is still much to improve and explore regarding the use and study of such technologies²⁸.

In this context, the e-Therapies Project was developed to offer and evaluate the effectiveness of psychosocial interventions as online therapeutic groups. This study aimed to answer the following question: "What is the effectiveness of the online psychosocial interventions carried out by the 'e-Therapies Project' in reducing symptoms of depression, anxiety, and stress in the population served?" Therefore, this study sought to evaluate the effectiveness of online psychosocial interventions in reducing symptoms of depression, anxiety, and stress during the COVID-19 pandemic.

METHODOLOGY

This is a quasi-experimental, pre-and-post study²⁹, based on anxiety, stress, and depression symptom measurement scales, to evaluate online group psychosocial interventions performed through the e-Therapies Project.

This project emerged during the COVID-19 pandemic because of the Action Research titled “Effectiveness of psychosocial e-therapies in coping with the COVID-19 pandemic,” involving two public higher education institutions in Brazil and the support of the Bahia State Research Support Foundation (FAPESB), through the Support Program for Priority Research to the Unified Health System (PPSUS).

Utilizing the e-Therapies Project, four main modalities of online group psychosocial interventions were developed: well-being therapies aimed at promoting well-being via group interaction and directed activities; psychosocial support therapies, which work with care strategies to reduce symptoms of depression, anxiety, and stress; matrix support therapies that offer support and reflections on professional practices and their challenges; and expressive therapies that allowed the expression of feelings and emotions through writing, speech, and the arts. In total, distributed across the four modalities, the project developed 19 different online group psychosocial interventions, offered biannually during the years 2020 and 2021, using approaches such as: integrative community therapy, enneagram, life skills, caring for sleep quality, literary chat, therapeutic writing, and network dialogues - the latter for listening and matrix support of health care and social assistance networks workers³⁰.

Each group intervention occurred in weekly or bi-weekly meetings, lasting about three months, totaling 8 to 12 meetings per group, with each session lasting between one and two hours. At least two professionals performed the mediation; they were from various health areas, active in mental health, namely: nursing, psychology, psychiatry, physical education, physiotherapy, nutrition, occupational therapy, and social assistance professionals. All of them received training to provide services through internet-based information and communication technologies using free digital platforms, in a synchronous manner and with the possibility of videoconferencing.

The “menu of offerings” of online psychosocial therapies was available on the project’s specific website, with specifications of the group proposals, frequency, start dates and meeting forecasts, targeted audiences, as well as information about the mediators and their approaches. Interested individuals could access the registration form and indicate their choices.

The non-probabilistic sample consisted of 66 participants from the online intervention groups who met the following inclusion criteria: being over 18 years old; agreeing to participate in the research by signing the Informed Consent Form; and responding to the evaluation forms before and after the intervention. Those who responded to the evaluation form only at one time point and those who indicated participation in more than one e-therapy modality during the same period were excluded from the sample.

An online questionnaire adapted to Google Forms was utilized, taking approximately ten minutes to complete, containing sociodemographic data such as: gender, age group, color, children, occupation, income, education, religion, residence city, COVID-19 status, and reported health state. Additionally, they answered the 21 items of the Short Depression, Anxiety, and Stress Scale (DASS-21). This questionnaire was made available for self-application at two points: pre-therapy, considered in the first week of interventions, and post-therapy, in the final week of interventions.

The DASS-21 is a self-report scale featuring 21 items, adapted and validated for Brazilian Portuguese. Scores are assigned on a Likert scale, ranging from 0 (did not apply at all) to 3 (applied very much or most of the time), reflecting the participants’ feelings over the last week. The instrument consists of three subscales: depression, anxiety, and stress. Scores for each subscale were summed and multiplied by 2 to obtain the final score, indicating the severity levels of symptoms³¹.

Data were initially analyzed using descriptive statistics, presented as mean and

standard deviation for continuous variables, and absolute and relative frequencies for categorical variables. A posteriori power calculation was performed using G Power v. 3.1.9.4 software with the smallest effect size found in the study ($d_z=0.35$), a 5% error, and $n=66$, resulting in an approximate power of 88%. Cronbach's Alpha Coefficient was used to evaluate the internal consistency (20) of the DASS-21 instrument in each of its dimensions, as well as the total score at pre- and post-therapy moments. The findings suggest reliability, as per Cronbach's coefficient analysis³², which varied between high (0.75-0.90) and very high (>0.90). Using the paired ttest, a comparison was made between the average scores from the DASS-21, for each dimension, and the total scores between pre- and post-therapy moments. The effect size (Cohen's d_z) for comparing paired samples was calculated considering values small ($d_z=0.20-0.49$); medium ($d_z=0.50-0.79$); large ($d_z=0.80-1.19$) and very large ($d_z \geq 1.20$)³³. To assess the proportion of results regarding symptom severity levels, at pre- and post-therapy moments, the McNemar Test for related samples was used, recategorizing the DASS-21 into "expected levels" and "above expected levels," considering the scale's cutoff points: depression ≥ 10 , anxiety ≥ 7 , stress ≥ 1434 . A significance level of 5% was adopted for all analyses, and the statistical package used was IBM SPSS Statistics for Windows, Version 25.0 (Armonk, NY: IBM).

The National Research Ethics Commission approved this study under the opinion number 4.063.178 and CAAE 31567220.51001.5526.

To respond to the electronic questionnaire, all participants consented to their participation, through agreement with the Informed Consent Form (ICF) contained in the questionnaire.

RESULTS

In total, 309 responses were collected at the pre-therapy moment and 141 responses at the post-therapy moment. After applying the exclusion criteria, the sample consisted of $n=66$. Most participants were female (83.3%), and young adults aged 20 to 40 years (65.2%) without children (65.2%). Regarding race, 78.7% declared themselves as black, mixed race, and of indigenous origin. Of the participants, 69.7% lived in cities around one of the universities where the action research took place. The most frequent occupation reported was students (40.9%), mostly university students (36.4%), followed by health professionals (13.6%), teachers (12.1%), and 33.3% were distributed among other professions or unemployed. Altogether, 42.4% declared a family income of up to R\$ 2,000.00. Considering the level of education, 63.6% have at least a higher education degree, and 77.3% reported having a religion (Table 1).

At the time participants started the e-therapies, 93.9% had not yet tested positive for COVID-19, and 28.8% had already been in quarantine or social isolation. The general health status was self-reported by 31.8% of participants as fair to very poor (Table 1).

Table 1. Characteristics of the study participants ($n=66$)

Categorical Variables	(Continua)	
	N	%
Gender		
Female	55	83.3
Male	11	16.7
Age		
Young adult	43	65.2
Middle age	23	34.8

(Conclusão)

Categorical Variables	N	%
Children		
Yes	23	34.8
No	43	65.2
Race		
White	13	19.5
Indigenous origin	01	1.5
Mixed Race	29	43.9
Black	22	33.3
Not declared	01	1.5
City		
Around UESC	46	69.7
Other regions	20	30.3
Education		
Elementary school/High school	24	36.4
Higher	42	63.6
Profession		
Unemployed	02	3.0
Students	27	40.9
Teachers	08	12.1
Health professionals	09	13.6
Other professions	20	30.3
Monthly income*		
Up to R\$ 1,000.00	19	28.8
From R\$ 1,001.00 to R\$ 2,000.00	28	42.4
Above R\$ 2,000.00	19	28.8
Tested for COVID-19:		
Yes	04	6.1
No	62	93.9
Quarantine/Isolation		
Yes	19	28.8
No	47	71.2
Health status (self-reported)		
Very poor	04	6.1
Poor	02	3.0
Fair	15	22.7
Good	35	53.0
Very good	10	15.2
e-Therapy choice		
Well-being therapies	12	18.2
Psychosocial support therapies	36	54.5
Matrix support therapies	7	10.6
Expressive therapies	11	16.7

* Minimum wage in 2020 and 2021: R\$1,039.00 and R\$1,100.00.

Regarding participation in the offered online psychosocial therapy modalities, the distribution of choices among participants

was 18.2% for well-being promotion therapies; 54.5% for psychosocial support therapies; 10.6% for matrix support therapies; and 16.7% for

expressive therapies. Comparisons between the average scores at pre- and post-therapy moments are presented in Table 2, according to the DASS-21 dimensions and the total score. Statistically significant differences ($p < 0.01$) were observed in the average scores across all dimensions, with

effect sizes ranging from small (0.20-0.49) to medium (0.50-0.80). There was a reduction in symptoms of depression and anxiety after the interventions, particularly with the largest effect size observed in the stress dimension.

Table 2. Comparison between the averages according to time and construct of the DASS-21 (n=66)

	Pre-e-therapy	Post-e-therapy	ES*	t	p
Depression	7.45 ± 5.70	5.76 ± 5.37	0.35	2.842	0.006
Anxiety	7.08 ± 5.52	5.26 ± 5.07	0.35	2.863	0.006
Stress	10.32 ± 5.90	7.59 ± 5.65	0.52	4.245	<0.001
Total score	49.70 ± 31.42	37.21 ± 29.74	0.46	3.750	<0.001

* ES – effect size (Cohen's *d*)

Considering the frequencies of responses to the DASS-21 by levels of symptom severity, the comparison between pre- and post-therapy moments is demonstrated in Table 3. The exact McNemar test showed differences in the proportions of responses for the expected levels

of symptoms and levels above expected, between the two evaluation moments in the dimensions of the DASS-21, with $p < 0.05$ for each of them. However, when comparing the proportions to the total result, the difference was not statistically significant.

Table 3. Frequency by time and severity level of the DASS-21 (n=66)

	Pre-therapy		Post-therapy	
	N	%	N	%
Depression				
Expected levels	38	(57.6)	53	(80.3)
Above expected levels	28	(42.4)	13	(19.7)
Anxiety				
Expected levels	35	(53.0)	47	(71.2)
Above expected levels	31	(47.0)	12	(28.8)
Stress				
Expected levels	47	(71.2)	57	(86.4)
Above expected levels	19	(28.8)	9	(13.6)
Total				
Expected levels	50	(75.8)	58	(87.9)
Above expected levels	16	(24.2)	8	(12.1)

DISCUSSION

This study is among the few that evaluated the effectiveness of psychosocial therapies, created by multidisciplinary teams and offered as online therapeutic groups, in reducing symptoms related to depression, anxiety, and stress, during the COVID-19 pandemic period, as most studies in the literature focus on psychological interventions.

The findings suggest that online psychosocial therapies, applied weekly for about three months, served as psychosocial support, improving the mental health of the researched population. The differences in analyzed scores indicate an effect of these interventions in reducing symptomatology as measured by the DASS-21.

Regarding symptom severity levels, there was a shift from “expected levels” to “above expected levels” after the intervention. Although the differences in proportions considering the total result were not statistically significant, a higher number of individuals with expected symptom levels and a reduction in individuals with above expected levels were observed postintervention in the dimensions of depression, anxiety, and stress.

These findings support other studies that evaluated online interventions offered during times of coping with psychological distress resulting from events like the COVID-19 pandemic, which were deemed feasible and important for mitigating its effects on people’s mental health, especially in reducing symptoms of depression and anxiety³⁵.

Results related to stress showed differences with a larger effect size, as found in the literature²⁷. Only one meta-analysis that examined the efficacy of psychological support interventions for the general population and health professionals concluded there was a benefit in controlling depression and anxiety but reported an ambiguous effect for stress,

without statistically significant values. It is worth noting that this study also included face-to-face interventions^{25,27}.

It was noted that the demographic profile of those seeking online therapy groups aligns with the literature findings. The highlights are on populations more vulnerable to psychological distress with a higher likelihood of severe symptoms of depression, anxiety, and stress during this period: women, young adults (18 to 40 years), without children, non-white, university students, and those with a family income below R\$2,000.00, indicating low income. These data reveal the impact of gender, race, and social conditions on pandemic experiences³⁶⁻³⁷.

Concerning the reported occupations, there was participation from professionals throughout various fields, particularly health workers, who experienced an increased workload and thus greater exposure to COVID-19 contagion risk. The pandemic period heightened symptoms of depression, anxiety, and stress to varying degrees across different countries. Generally, posttraumatic stress levels were higher among these professionals, possibly one of the reasons they sought psychosocial support during this time³⁸.

Similarly, teaching professionals sought support, already burdened by workload, facing significant challenges due to pandemic-induced work changes, which lead to high levels of depression, anxiety, and stress³⁹.

The significant participation of university students in therapies might be because of extensive promotion within partner universities and the opportunity for emotional support amidst academic uncertainties, highlighting the psychosocial factors further compromising their mental health⁴⁰.

Although most survey respondents had not contracted COVID-19 or been quarantined when starting therapies, pandemic-induced fear of these situations and self-reported fair and poor health suggest mental health impacts,

as indicated by early pandemic studies with COVID19 symptomatic individuals⁴¹.

The most sought-after therapies focused on psychosocial support and well-being promotion, likely due to their direct strategies for handling pandemic-aggravated anxiety and stress symptoms. Further research could help understand participant choices, motivation, adherence, and satisfaction with e-therapies, potentially improving their offerings.

The utilization of internet-based information and communication technologies was crucial for reaching the population when physical contact was hindered by enforced distancing measures. By reducing symptoms of stress, anxiety, and depression, online psychosocial interventions served as vital psychosocial support and care, facilitating connections and exchanges of experiences. These results align with studies^{20, 24, 42} showing online group interventions as a viable and effective mental health promotion strategy for public health services, aiming to improve access and quality of care. Thus, online interventions enable interaction between those needing support and those able to provide it, even beyond the pandemic context⁴³, suggesting the benefit of targeted interventions for specific groups²⁰.

This study also supports expanding roles in mental health care through a multidisciplinary approach, training professionals as online therapeutic group moderators, allowing diverse intervention types. It encourages developing apps for psychosocial support and detailed, continuous data collection on human behavior and health, like the Neuropesquisa App²⁸, designed for studying mental health biomarkers. Therefore, digital tools could enhance mental health prevention and promotion actions.

However, access to communication devices and quality internet is not universal in the study country, presenting a public health challenge for low-income populations. Another access challenge is the need for digital technology

education for populations struggling with existing tools. A study⁴⁴ on digital training for older individuals provides strong evidence of education as a tool for the use of new technology by this group, potentially improving psychological life quality scores, particularly autonomy.

Finally, limitations of this study relate to the sample type, as the evaluated intervention was demand-driven, with participants enrolling based on interest and availability; lack of detailed sociodemographic data; no separate evaluation of each online psychosocial therapy, complicating effectiveness comparisons; findings only reflect self-reported symptoms; no investigation into additional strategies or treatments used alongside e-Therapies; and the absence of a control group.

CONCLUSION

This study confirmed the importance of psychosocial interventions in mitigating the adverse mental health effects of the COVID-19 pandemic's scale. The findings suggest that online psychosocial therapies, provided in groups by multidisciplinary mental health teams, reduce symptoms of depression, anxiety, and stress. These therapies serve as well-being promotion strategies, psychosocial and matrix support, and offer expressive spaces for coping with the pandemic context.

Despite its limitations, the study highlights the potential of expanding mental health therapeutic actions accessible from any distance through internet-based information and communication technology. These actions should target populations needing psychosocial support during challenging times, like the COVID-19 pandemic, and can be replicated in other settings, including public health services.

While online psychosocial therapies have proven to be an effective support, they should not be seen as the sole option, especially for more severe cases of depression, anxiety, and stress.

Future studies are recommended to address the limitations of this study, enhancing the use of these strategies and gathering more evidence on their efficacy.

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