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The effect of an Internet-based cognitive behavioral therapy intervention on social support in disaster evacuees

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Abstract

Introduction: Both exposure to a natural disaster and psychological symptoms may lead to decreases in social support. Few studies have examined ways to improve social support among victims of natural disasters.

Aims: The objective of the study was to assess emotional and tangible support following a 12-session Internet-based cognitive behavioral therapy (ICBT) targeting posttraumatic stress (PTS), insomnia, and depression symptoms and to examine the association between posttreatment symptoms and emotional and tangible support.

Materials and Methods: One hundred and seventy-eight wildfire evacuees with significant PTS, depression and/or insomnia symptoms were given access to the ICBT. They completed questionnaires at pre- and posttreatment to measure social support and symptom severity.

Results: Results show that completion of the treatment led to an improvement in emotional support. Lower post-treatment PTS and insomnia symptoms were associated with higher posttreatment emotional support.

Conclusion: ICBT may contribute to enhance emotional support through symptom improvement and probably more so when social support is address directly in treatment.

KEYWORDS
Internet cognitive-behavioral therapy, posttraumatic stress disorder, social support

1 | INTRODUCTION

Exposure to a natural disaster can lead to a decrease in functional social support (Shiba et al., 2020). Functional social support refers to an individual's perception of the quality of their social support and network. It can take various forms such as emotional (e.g., empathy, companionship) and tangible (e.g., financial loans, assistance with cleaning) support (Wang et al., 2017). The decrease in social support after a natural disaster may be due to the destruction of facilities that promote social interactions (e.g., homes, community centers, and work offices) and to unmet expectations of social support from others (Kaniasty et al., 1990). Expectations of social support may not be met because the usual providers of support (i.e., family members and friends) are themselves victims of the disaster. Relocation may also have negative impacts on social support and relationships (Thériault et al., 2021).

Lack of social support is one of the most robust predictors of posttraumatic stress disorder (PTSD; Dar et al., 2018), major depression disorder (MDD; Dar et al., 2018), and insomnia (Belleville et al., 2022) after a traumatic event. The relationship between social support and psychopathology may be bidirectional, as the presence of PTS symptoms following a natural disaster can also lead to a decrease in social support in victims of natural disasters (Platt et al., 2016). Platt and colleagues (2016) demonstrated that the presence of severe PTS symptoms 2–6 months after a natural disaster leads to lower emotional support 5–9 months postdisaster. Low social support is, therefore, both a risk factor of the onset of PTS symptoms and a consequence of chronic PTS symptoms.

The reduction of psychological symptoms could be linked to better social support among victims of natural disasters. According to social selection theory (Dohrenwend, 2000), people with high levels of psychopathology may lack supportive relationships or perceived them as less accessible. Conversely, healthy individuals thrive in social relationships and have greater social support. Based on this theory, a decrease in psychological symptoms could lead to an improvement in social support. Almquist and colleagues (2016) observed that the decrease in depression symptoms in 1001 women of the general population led to an improvement in functional and structural (i.e., number of social contacts) social support. Similarly, Cox and colleagues (2017) examined this relationship in 117 veterans and noted a link between a decrease in PTS symptoms and an improvement in social support. To our knowledge, no study has yet examined whether therapy aimed at reducing symptoms commonly observed in survivors of natural disasters such as depression, PTS, and insomnia, also leads to an improvement in social support in survivors of natural disasters.

Cognitive-behavior therapy (CBT) is known to be an effective treatment for PTSD, MDD, and insomnia. Although social support may not be a direct treatment target in CBT, several studies suggest that CBT for depression can lead to improvements in social support (Cuijpers & Karyotaki, 2021). However, other studies examining the effect of CBT for MDD (Allart-Van et al., 2003; Cramer et al., 2011) and PTSD (Johnson et al., 2011) did not report such improvements. Based on the current literature, it is thus difficult to conclude on the effectiveness of CBT in improving social support among victims of natural disasters, in whom social support appears to decrease with time (Shiba et al., 2020).

Internet-based cognitive behavioral therapy (ICBT) is as effective as in-person CBT in the treatment of several psychopathologies, including PTSD (Sijbrandij et al., 2016), insomnia (Zachariae et al., 2016), and MDD (Carlbring

et al., 2018). ICBT may be more accessible than in-person CBT following a natural disaster. Binet and colleagues (2021) examined the perceived barriers to treatment among 1510 evacuees of the Fort McMurray wildfires that occurred in May 2016. They found that approximately 20% of participants with a perceived need for psychotherapy did not seek psychological help due to structural barriers and lack of time. They also observed that the main barrier to treatment reported by evacuees in the year following the wildfires was their preference to manage their psychological difficulties by themselves. Victims of natural disasters appear to seek a sense of autonomy in their recovery, which an online modality can provide. Indeed, ICBT bypasses structural and time barriers by being more flexible, accessible, and affordable (Andersson & Titov, 2014). As such, ICBT seems to be a suitable and accessible option for victims of natural disasters. However, the effectiveness of ICBT on social support remains to be established.

The current study was part of a larger research project in which we developed a 12-session ICBT that aimed to reduce PTS, depression, and insomnia symptoms in survivors of natural disasters (Belleville et al., 2022). In secondary data analyses, it was found that participants who accepted the invitation to participate in the treatment had more severe symptoms and lower social support than those who declined the invitation. This observation suggested that participants with lower social support and severe symptoms were possibly more in need and more interested in pursuing the ICBT than those with higher social support. We, therefore, saw fit to pursue these analyses and examine if the ICBT was effective to improve social support in participants.

The main objectives of the present study were to assess emotional and tangible support following a 12-session internet-based ICBT targeting PTS, insomnia, and depression symptoms and to examine the association between posttreatment symptoms and emotional and tangible support. It was hypothesized that completing the ICBT would lead to an improvement in emotional and tangible support and that lower severity of PTS, insomnia, and depression symptoms at posttreatment would be associated with higher emotional and tangible support.

2 | METHOD

2.1 | Procedure and participants

The 2016 wildfires in Fort McMurray, Alberta (Canada) led to the largest evacuation in the province's history at this time. The wildfires led to the displacement of nearly 88,000 people and destroyed approximately 2400 homes and buildings. In a representative sample of 1510 evacuees, the average length of evacuation was 47 days and approximately 28% reported loss or damage to their homes (Belleville et al., 2021). This study was part of a larger research project that aimed to understand the needs of the Fort McMurray population in terms of mental health after the wildfires of 2016 and to assess the efficacy of an ICBT targeting PTS, insomnia, and depression symptoms. A telephone survey was first conducted in May 2017 with 1510 randomly selected participants to assess the prevalence of PTS, insomnia, and depression symptoms among the evacuees (T0). Among these participants, 364 accepted to participate in a longitudinal study which involved taking part in a phone clinical interview, completing online questionnaires, and the possibility to receive access to an online treatment at some point (even if they had not sought out treatment by themselves). Online questionnaires were administered at four time points, each separated by a period of 6 months (i.e., T1 = November 2017; T2 = May 2018; T3 = November 2018; T4 = May 2019). They included validated self-reported measures of the severity of PTS (PTSD Checklist for DSM-5 [PCL-5]), insomnia [Insomnia Severity Index, ISI], and depression [Patient Health Questionnaire, PHQ-9]) symptoms as well as other psychological components such as social support, well-being, posttraumatic growth, and anxiety.

To be eligible to receive treatment, participants had to report either significant PTS symptoms (PCL-5 ≥ 23) or some PTS symptoms (PCL-5 ≥ 10) with at least mild depression symptoms (PHQ-9 ≥ 5) and/or subclinical insomnia symptoms (ISI ≥ 8). Participants were not required to have a PTSD, MDD, or insomnia diagnostic to be included. They also had to be at least 18 years old, speak English, have been evacuated from the Fort McMurray 2016

wildfires, and have access to the internet. The following exclusion criteria were applied: lifetime diagnosis of any psychosis or bipolar or substance use disorder, current severe suicidal ideations, and cognitive disorder susceptible to influence participation in the study.

At T1, in November 2017 (1.5-year postdisaster), a subsample of 10 participants meeting the inclusion criteria were randomly selected and invited to participate in a pilot study to test the functionality of the treatment platform (8 who accessed the platform). At T2, in May 2018, all remaining participants meeting the inclusion criteria for the treatment ($n = 136$) were randomly assigned to either a treatment group ($n = 69$, 32 who accessed the platform) or a waitlist group ($n = 67$). Participants in the treatment group started the treatment at T2, in May 2018. At T3, in November 2018, participants in the waitlist group ($n = 67$, 26 who accessed the platform), and participants who newly met the inclusion criteria at T3 but not at T2 ($n = 32$, 15 who accessed the platform) were given access to the online treatment platform. In total, at any time point, 81 participants accessed the first session and 42 completed the 12 sessions of ICBT. The sociodemographic and clinical characteristics of participants are presented in Table 1. As different subsamples of participants were used in the analyses supporting the two objectives of the study, we assessed the equivalence of these subsamples on all sociodemographic variables; χ^2 analyses showed no differences in the distribution of these variables across subsamples (all $ps > 0.05$; see Table 1). This study was reviewed and

TABLE 1 Sociodemographic characteristics of participants at baseline.

	Randomized control trial participants (Objective 1)				Participants invited to the treatment at any time point (Objective 2; $n = 178$)	
	Treatment group ($n = 69$)		Waitlist group ($n = 67$)			
Baseline characteristics	***n***	**Valid %**	***n***	**Valid %**	***n***	**Valid %**
Gender						
Female	454	78.3	49	73.1	124	69.7
Male	15	21.7	18	26.9	54	30.3
Marital status						
Married/common law	49	71	38	67.9	120	72.3
Single	20	29	18	32.1	46	27.7
Ethnicity						
White	61	88.4	50	74.6	141	80.1
Other than White[a]	8	11.6	17	25.4	35	19.9
Highest education level						
Primary or secondary education	19	27.9	14	25.5	42	25.5
Postsecondary degree	49	72.1	41	74.5	123	74.5
Use of a medication for a psychological problem						
Yes	20	29	25	44.6	57	34.1
No	49	71	31	55.4	110	65.9
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Age	45.52	11.14	43.95	11.63	44.16	11.45

[a]Includes members of a First Nation or Metis, Asian or Pacific Islander, Hispanic or Latino, and Black or African American.

approved by Comité D'éthique de la Recherche de l'Université Laval. The participants provided their written informed consent to participate in this study. The original protocol of the randomized clinical trial of the main study is available on ClinicalTrials.gov (NCT04808713).

2.2 | Measures

2.2.1 | Modified Medical Outcomes Study Social Support Survey (mMOS-SS)

The mMOS-SS is an eight-item self-report questionnaire that assesses emotional and tangible support (i.e., four items for emotional support and four items for tangible support; Moser et al., 2012). The total score for each social support subscale ranges between 4 and 20 with higher scores indicating better emotional or tangible support. The mMOS-SS subscales have a very good ability to discriminate between emotional and tangible support (Moser et al., 2012). mMOS-SS shows a very good internal consistency for the total score (Cronbach's α: 0.88–0.93) and a good construct and discriminant validity (Moser et al., 2012). In the present study, the mMOS-SS emotional and tangible support subscales demonstrated excellent reliability at T1, T2, T3, and T4 (emotional support Cronbach's αs = 0.92, 0.94, 0.93, and 0.93, respectively; tangible support Cronbach's αs = 0.96, 0.97, 0.96, and 0.97, respectively). The emotional and tangible support subscales were used to measure the change in social support following ICBT and its associations with symptom severity.

2.2.2 | PTSD Checklist for DSM-5

The PCL-5 is a 20-item self-report questionnaire that assesses PTS symptoms (Weathers et al., 2013). The total score range between 0 and 80 with higher scores indicating higher symptom severity. PCL-5 scores show strong internal consistency (α = 0.94), test–retest reliability (r = 0.82), and discriminant (s = 0.31 to 0.60) and convergent (s = 0.74–0.85) validity (Blevins et al., 2015). In the present study, the PCL-5 total score demonstrated excellent reliability at T1, T2, T3, and T4 (Cronbach's αs = 0.96, 0.95, 0.96, and 0.96, respectively). The PCL-5 was used as a measure of PTS symptom severity.

2.2.3 | Patient Health Questionnaire Depression Scale

The PHQ-9 is a nine-item self-report questionnaire that assesses the cluster A symptoms of depression (Kroenke et al., 2001). The total score range between 0 and 27 with higher scores indicating higher symptom severity. PHQ-9 shows excellent internal (α = 0.89) and test–retest reliability (r = 0.84; Kroenke et al., 2001). In the present study, the PHQ-9 total score demonstrated excellent reliability at T1, T2, T3, and T4 (Cronbach's αs = 0.93, 0.94, 0.93, and 0.93, respectively). The PHQ-9 was used as a measure of depression symptom severity.

2.2.4 | Insomnia Severy Index

The ISI is a seven-item self-report questionnaire that assesses the severity of insomnia symptoms and monitors symptom change (Bastien et al., 2001). The total score range between 0 and 28 with higher scores indicating higher symptom severity. ISI shows an excellent internal consistency (α = 0.90 to 0.91) and a good convergent validity (r = 0.80; Morin et al., 2011). In the present study, the ISI total score demonstrated excellent reliability at T1, T2, T3, and T4 (Cronbach's αs for all assessment times = 0.93). The ISI was used as a measure of insomnia symptom severity.

2.3 | Treatment

The RESILIENT platform (Belleville et al., 2022) is an online self-help treatment that was developed as part of a study to evaluate and support mental health issues in the population of Fort McMurray after the 2016 wildfires and evacuation. The platform consists of 12 sessions of ICBT focusing on PTS, insomnia, and depression symptoms. The platform was accessible at no cost for participants, and they could access it for a total period of 6 months. Each session included a psychoeducational component to read that addressed different topics (e.g., effects of trauma, social support, prolonged exposure). To address PTS symptoms, CBT evidence-based strategies included in vivo and imaginal exposure, cognitive restructuring, and imagery rescripting and reprocessing therapy for nightmares. To address sleep difficulties, the treatment proposed CBT evidence-based strategies for insomnia, such as stimulus control, sleep restriction, cognitive techniques to change faulty beliefs and attitudes toward sleep and sleep hygiene education. To address depression symptoms, the treatment proposed cognitive restructuring and behavioral activation focused on pleasant, physical, and social activities. Each session also included interactive exercises to practice the new skills learned in the treatment.

The platform also offered six interactive tools that could be accessed at any time: a sleep diary calculating average weekly sleep efficiency and providing recommendations for bedtime and arising time, a diaphragmatic breathing exercise self-monitoring tool, an activity planner to support behavioral activation, a prolonged exposure exercise planner and self-monitoring tool, a structured series of questions to support cognitive restructuring, and a problem-solving tool.

Considering the lack of social support frequently reported by survivors of natural disasters (Platt et al., 2016), and as part of the behavioral activation component of the platform, participants were invited to engage in social activities to improve their social support. This was addressed in the sixth and eighth sessions, which also proposed psychoeducation on social support, strategies to expand social networks, and suggestions on how to engage in positive relationships.

The participants also had weekly 30-min contact with a therapist by videoconference, phone, or email, according to the participant's preference. Analysis showed that 45% of the participants were contacted by phone, 32% by videoconference, and 23% by email. The therapist did not provide therapy, but guided and supported the participants, answered their questions, and reviewed their adherence. Therapists were graduate psychology students, supervised by a clinical psychologist. The main results of the randomized control trial (RCT) showed that the RESILIENT treatment platform was effective to decrease PTS, insomnia, and depression symptoms in evacuees from the 2016 Fort McMurray wildfires (Belleville et al., 2022).

2.4 | Data analyses

To assess the impact of the ICBT on emotional and tangible support, 2 × 2 mixed model analyses were performed, with the treatment conditions (treatment and waitlist group) as a between-groups variable and time of assessment (RCT pre- and RCT posttreatment, or T2 and T3) as a within-group variable. Three analyses were performed, one including all participants (intent-to-treat), one including participants who completed the sessions addressing social support (completed ≥ 8 sessions) and treatment completers (completed 12 sessions). Independent sample *t* tests were performed to determine mean differences between the treatment and waitlist group at each assessment time, and paired samples *t* tests were performed to examine the change in emotional and tangible support from pre- to posttreatment in the two groups. Only participants randomly assigned at T2 to either the treatment ($n = 69$) or the waitlist ($n = 67$) group were included in these analyses.

Multiple hierarchical regressions were performed to assess the predictive value of posttreatment PTS, insomnia, and depression symptoms on posttreatment emotional and tangible support. To identify potential confounding factors, correlation analyses were performed between the measures of symptoms and support and

sociodemographic variables. Marital status was the only sociodemographic variable significantly associated with posttreatment emotional and tangible support. To examine the contribution of each group of symptoms individually (i.e., PTS symptoms, depression symptoms, or insomnia symptoms) on social support (i.e., emotional support and tangible support), six multiple hierarchical regressions were performed, two per group of symptoms, while controlling for marital status and pretreatment social support and symptoms. All participants invited to the treatment at any time point (n = 178) were included in these analyses; pre- and posttreatment data could thus have been collected at different times.

Data were analyzed using SPSS (Version 27). Missing data caused by attrition or by participant failure to complete posttreatment assessments were not replaced. Nineteen percent of participants who received ICBT were lost to posttreatment.

3 | RESULTS

3.1 | ICBT and social support

Table 2 presents the results of mixed-model and contrast analyses for emotional and tangible support. Neither intent-to-treat (pretreatment tangible support: M = 3.14, SD = 1.33; posttreatment tangible support: M = 3.20,

TABLE 2 Mixed-model and contrast analyses comparing emotional and tangible support between treatment groups and assessment times.

	Emotional support					Tangible support		
	df	*F*	*t*	*p*	*Hedges' g*	*df*	*F*	*p*
	Intent-to-treat (treatment group, n = 69; waitlist group, n = 67)							
Time × Group interaction	1, 116.787	0.564		0.454		1, 112.374	2.341	0.129
	Completed ≥ 8 sessions (treatment group, n = 15; waitlist group, n = 67)							
Time × Group interaction	1, 68.564	6.133		0.016		1, 67.129	1.554	0.217
Pre- to posttreatment (treatment group)			−3.207	0.006	0.810			
Pre- to posttreatment (waitlist group)[a]			1.036	0.113	0.140			
Pretreatment (treatment vs. waitlist group)			−2.240	0.028	0.640			
Posttreatment (treatment vs. waitlist group)			−0.263	0.794	0.076			
	Completed the treatment (treatment group, n = 14; waitlist group, n = 67)							
Time × Group interaction	1, 67.567	6.491		0.013		1, 66.116	1.795	0.185
Pre- to posttreatment (treatment group)			−3.286	0.006	0.850			
Pretreatment (treatment vs. waitlist group)			−2.171	0.033	0.640			
Posttreatment (treatment vs. waitlist group)			−0.120	0.905	0.036			

[a]The results of the paired t test for the waitlist group are only reported once in the table.

SD = 1.36) nor completers (pretreatment tangible support: $M = 2.94$, SD = 1.29; posttreatment tangible support: $M = 3.21$, SD = 1.34) analyses revealed a significant Time × Group interaction on tangible support. No Time × Group interaction was observed on emotional support in the intent-to-treat analyses (pretreatment emotional support: $M = 3.30$, SD = 1.20; posttreatment emotional support: $M = 3.31$, SD = 1.10). However, completers analyses revealed significant Time × Group interactions on emotional support, both when including participants who completed 8 (pretreatment emotional support: $M = 2.72$, SD = 1.06; posttreatment emotional support: $M = 3.32$, SD = 1.08), or 12 sessions (pretreatment emotional support: $M = 2.71$, SD = 1.10; posttreatment emotional support: $M = 3.36$, SD = 1.11). Emotional support improved significantly from pre- to posttreatment for participants who completed 8 or 12 sessions but not for participants in the waitlist group (pre-emotional support: $M = 3.43$, SD = 1.13; posttreatment emotional support: $M = 3.39$, SD = 0.98). The difference between the treatment and waitlist groups on posttreatment emotional support was, however, not statistically significant. This may be due to the fact that participants who completed 8 or 12 sessions had significantly lower pretreatment emotional support than participants in the waitlist group. Indeed, pretreatment emotional support was only equivalent between the treatment and waitlist conditions in the intent-to-treat sample.

3.2 | Psychological symptoms and social support

Tables 3 and 4 present the results of the hierarchical multiple regression analyses measuring the effects of posttreatment PTS, insomnia, and depression symptoms on posttreatment emotional and tangible support. A first regression model showed that lower posttreatment PTS symptoms predicted higher emotional support at posttreatment (adjusted $R^2 = 0.38$, $F(4,129) = 20.64$, $p < 0.01$). The regression model explained 38% of the variance of posttreatment emotional support. Adding posttreatment PTS symptoms to the model increased the model's predictive capacity at predicting posttreatment emotional support by 3%. A second regression model demonstrated that lower posttreatment insomnia symptoms also predicted higher emotional support at posttreatment (adjusted $R^2 = 0.37$, $F(7,122) = 9.77$, $p < 0.01$). The regression model explained 36.8% of the variance of posttreatment emotional support. Adding posttreatment insomnia symptoms to the model increased the model's predictive capacity at predicting posttreatment emotional support by 2%. For these last two regression models, only marital status, pretreatment emotional support, and posttreatment symptoms (i.e., PTS or insomnia symptoms) were unique predictors of posttreatment emotional support. Lower posttreatment depression symptoms did not predict higher emotional support at posttreatment. Posttreatment PTS, insomnia, and depression symptoms did not predict posttreatment tangible support.

4 | DISCUSSION

Our results confirm that emotional support improved among participants who completed at least eight sessions of the treatment. This significant improvement in emotional support could be due to emotional support being specifically addressed in Session 6 and later again in Session 8. Participants possibly became more involved in their social network after the strategies targeting emotional support were addressed on the platform and encouraged by their therapist. This result is consistent with studies (Cuijpers & Karyotaki, 2021) that found that CBT completion led to an improvement in social support. However, other studies also found that completion of CBT did not lead to an improvement in social support (i.e., Allart-Van et al., 2003; Cramer et al., 2011). Differences between treatment strategies used in these studies and the current study may explain the differences in outcome.

Completion of the treatment did not lead to an improvement in tangible support. Psychoeducation and treatment strategies did not include any particular elements specific to tangible support, which could explain why

TABLE 3 Results of hierarchical multiple regressions predicting posttreatment emotional support.

Variables	*B*	SE (*B*)	*β*	*p*	Sr^2	Adjusted R^2	*p*	ΔR^2	*p*
	Posttraumatic stress symptoms (PCL-5)								
Model 1						**0.36**	<0.001	**0.37**	<0.001
Pretreatment emotional support	0.42	0.07	**0.46**	<0.001	0.18				
Pretreatment PTS severity	−0.01	0.01	−0.09	0.204	−0.01				
Marital status	0.58	0.17	**0.26**	0.001	0.06				
Model 2						**0.38**	<0.001	**0.03**	0.023
Pretreatment emotional support	0.44	0.07	**0.48**	<0.001	0.19				
Pretreatment PTS severity	0.01	0.01	0.08	0.460	<0.01				
Marital status	0.57	0.17	**0.25**	0.001	0.06				
Posttreatment PTS severity	−0.02	0.01	**−0.23**	0.023	−0.03				
	Insomnia symptoms (ISI)								
Model 1						**0.35**	<0.001	**0.37**	<0.001
Pretreatment emotional support	0.43	0.07	**0.47**	<0.001	0.19				
Pretreatment insomnia severity	−0.01	0.01	−0.05	0.476	<−0.01				
Marital status	0.57	0.17	**0.25**	0.001	0.06				
Model 2						**0.37**	<0.001	**0.02**	0.040
Pretreatment emotional support	0.43	0.07	**0.47**	<0.001	0.19				
Pretreatment insomnia severity	0.01	0.01	0.05	0.593	<0.01				
Marital status	0.56	0.17	**0.25**	0.001	0.06				
Posttreatment insomnia severity	−0.03	0.01	**−0.18**	0.040	−0.02				
	Depression symptoms (PHQ-9)								
Model 1						**0.36**	<0.001	**0.38**	<0.001
Pretreatment emotion support	0.41	0.07	**0.44**	<0.001	0.16				
Pretreatment depression severity	−0.02	0.01	−0.11	0.144	−0.01				
Marital status	0.57	0.17	**0.25**	0.001	0.06				
Model 2						**0.36**	<0.001	0.01	0.181
Pretreatment emotional support	0.42	0.07	**0.45**	<0.001	0.17				
Pretreatment depression severity	−0.01	0.01	−0.05	0.591	<−0.01				
Marital status	0.55	0.17	**0.24**	0.001	0.05				
Posttreatment depression severity	−0.02	0.01	−0.11	0.181	−0.01				

Abbreviations: ISI, Insomnia Severity Index; PCL-5, PTSD Checklist for DSM-5; PHQ, Patient Health Questionnaire; PTS, posttraumatic stress.

TABLE 4 Results of hierarchical multiple regressions predicting posttreatment tangible support.

Variables	*B*	SE (*B*)	*β*	*p*	Sr^2	Adjusted R^2	*p*	ΔR^2	*p*
	Posttraumatic stress symptoms (PCL-5)								
Model 1						**0.51**	<0.001	**0.52**	<0.001
Pretreatment tangible support	0.62	0.07	**0.59**	<0.001	0.28				
Pretreatment PTS severity	−0.01	0.01	−0.07	0.283	<−0.01				
Marital status	0.63	0.20	**0.21**	0.002	0.04				
Model 2						**0.51**	<0.001	<0.01	0.814
Pretreatment tangible support	0.62	0.07	**0.59**	<0 0.001	0.28				
Pretreatment PTS severity	−0.01	0.01	−0.05	0.549	<−0.01				
Marital status	0.63	0.20	**0.21**	<0.001	0.04				
Posttreatment PTS severity	<−0.01	0.01	−0.02	0.814	<−0.01				
	Insomnia symptoms (ISI)								
Model 1						**0.51**	<0.001	**0.52**	<0.001
Pretreatment tangible support	0.61	0.07	**0.58**	<0.001	0.26				
Pretreatment insomnia severity	−0.02	0.01	−0.08	0.197	−0.01				
Marital status	0.63	0.20	**0.21**	0.002	0.04				
Model 2						**0.51**	<0.001	<0.01	0.897
Pretreatment tangible support	0.61	0.07	**0.58**	<0.001	0.26				
Pretreatment insomnia severity	−0.02	0.02	−0.08	0.307	<−0.01				
Marital status	0.63	0.20	**0.21**	0.002	0.04				
Posttreatment insomnia severity	<−0.01	0.01	−0.01	0.897	<0.01				
	Depression symptoms (PHQ-9)								
Model 1					<−0.01	**0.51**	<0.001	**0.52**	<0.001
Pretreatment tangible support	0.62	0.07	**0.60**	<0.001	0.28				
Pretreatment depression severity	−0.01	0.01	−0.05	0.395					
Marital status	0.62	0.20	**0.21**	0.002	0.04				
Model 2						**0.51**	<0.001	<0.01	0.656
Pretreatment tangible support	0.62	0.07	**0.60**	<0.001	0.28				
Pretreatment depression severity	−0.01	0.02	−0.07	0.339	<0 −0.01				
Marital status	0.62	0.20	**0.21**	0.002	0.04				
Posttreatment depression severity	0.01	0.01	0.03	0.656	<0.01				

Abbreviations: ISI, Insomnia Severity Index; PCL-5, PTSD Checklist for DSM-5; PHQ, Patient Health Questionnaire; PTS, posttraumatic stress.

no significant improvement was observed. Tangible support may also be more difficult to obtain in a post-natural disaster setting where needs typically exceed the availability of help or resources (Kaniasty et al., 1990).

As predicted, lower severity of PTS and insomnia symptoms at posttreatment predicted higher posttreatment emotional support. These results are consistent with the social selection theory (Dohrenwend, 2000) and past studies (Almquist et al., 2016; Cox et al., 2017). However, it must be noted that contrary to what was hypothesized, we did not find that lower severity of depression symptoms at posttreatment led to higher posttreatment emotional support. This result contrasts with that of McCall et al. (2001)' study, who found that in inpatients with severe depression, a decrease in depression symptoms was linked to improvement in social support. Participants in the present study had mild depression symptoms, which could explain the lack of association. Our results are in line with several studies which did not reveal a relationship between depression symptoms and social support, and these studies also included participants with subclinical depression symptoms (Allart-van Dam et al., 2003) or excluded participants with severe depression symptoms (Cramer et al., 2011). Severe baseline depression symptoms may therefore be needed to observe an improvement in emotional support after treatment.

Methodological limitations must be considered in interpreting the present results. Despite the improvement of emotional support in the treatment group, participants did not differ significantly from waitlist participants in terms of emotional support at posttreatment. The failure of the treatment to yield superior emotional support at posttreatment appears to be attributable to the nonequivalence of the two groups on pretreatment emotional support. Participants in the treatment group had lower pretreatment emotional support than participants in the waitlist group when only participants who completed at least eight sessions were included in the analyses. However, these results also highlight that participants with lower social support were more likely to stay engaged in the treatment. Another limit of the study is the high treatment attrition rate which led to observe some effects only in participants who completed 8 or 12 sessions. However, in this particular study, participants were offered the treatment prospectively without having explicitly expressed a need for therapy. It is therefore noteworthy that the sample was not composed of help-seeking participants, suggesting that effect sizes could have been even greater if only treatment seekers had been enrolled. Despite this particularity, our rate of pretreatment attrition is similar to other studies with a population-based sample that have attempted to disseminate online tools for managing psychological symptoms after a natural disaster (Price et al., 2015).

Despite these limitations, our study was the first to examine the impact of ICBT on social support among victims of natural disasters. The results of this study contribute to expanding the knowledge on the improvement of social support in a population that often lacks social support. We also examined the impacts of three different types of symptoms on social support, all of which were assessed using validated instruments. Lastly, the inclusion of a waitlist group allowed us to methodologically ensure that the improvement in emotional support was attributed to the effect of ICBT and not to confounding factors.

In conclusion, this study showed that ICBT and lower severity of symptoms can improve social support in evacuees of natural disasters. The results of this study can guide clinicians in tailoring their treatment to enhance social support. Since an improvement in emotional support was observed after it was addressed in treatment, clinicians should consider addressing it early on in treatment. Future studies should examine which specific treatment strategies can improve emotional support. Given the effectiveness (Belleville et al., 2022) of ICBTs for victims of natural disasters, future research should also focus on examining the impact of the use of the treatment platform on social support.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Research data are not shared.

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