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# Use of EMDR-Derived Self-Help Intervention in Children in the Period of COVID-19: A Randomized-Controlled Study

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Self-help treatments are an important intervention tool, with high accessibility and ease of application. To our knowledge, no research has previously been conducted on any self-help intervention derived from eye movement desensitization and reprocessing (EMDR) therapy. In this study, we evaluated the mental health status of children not directly affected by the pandemic and investigated the effects of using an EMDR-derived self-help intervention in children as a low-intensity treatment. The mental health status of 178 children was evaluated online via the State-Trait Anxiety Inventory for Children (STAIC) and Childhood Posttraumatic Stress Reaction Index (CPTS-RI). Then, children were randomly assigned to intervention and waitlist. A booklet containing EMDR-derived techniques was sent via the school online portal and the intervention was conducted. Posttests were administered 4 weeks later. The attrition rate was 45.5%, with 97 children completing the trial (intervention: 52; waitlist: 45). At baseline, 76.4% of children showed posttraumatic stress symptoms (PTSS) above threshold. Results showed a statistically significant decrease in the posttest PTSS scores for the intervention group compared to waitlist. The intervention group had significant pre–post improvement on all but one subscale, while the waitlist group showed a significant increase in state anxiety on the STAIC. In conclusion, posttraumatic stress was found to be high in children during the COVID-19 outbreak period, and EMDR-derived self-help intervention appeared to be an effective psychosocial intervention tool.

**Keywords:** COVID-19; acute stress; anxiety; children; psychosocial intervention; eye movement desensitization and reprocessing (EMDR) therapy

**T**his study examines a unique self-help protocol, designed using eye movement desensitization and reprocessing (EMDR) techniques, to reduce children’s anxiety about COVID-19 and traumatic distress. The study was conducted early in the pandemic, in May 2020, with students aged 8–10 from a public school in Gaziantep, Turkey.

## COVID-19-Related Stress

The novel coronavirus (COVID-19), which emerged on December 1, 2019, in Wuhan city of Hubei

province of China, has rapidly spread throughout the world and was declared as a pandemic by the World Health Organization on March 11, 2020. COVID-19 has become an urgent threat to public health due to its high contagiousness, permanent damage to the human body, and its life-threatening effects, especially for the elderly and individuals with chronic conditions.

In Turkey, the first cases of COVID-19 were detected on March 10, 2020, and it was reported to have spread to all cities by the Republic of Turkey Ministry of Health on April 1, 2020 (Koca, 2020). The virus continues to spread in both Turkey and the

world. As of October 26, 2020, the number of confirmed cases and number of deaths in Turkey was announced as 1,809,809 and 16,199, respectively, and these figures were 72,220,080 and 1,613,863 worldwide, respectively (WorldoMeters, 2020). With the appearance of COVID-19 cases in Turkey, a series of measures have been taken proactively by the Scientific Committee of the Ministry of Health. Within the scope of these measures, all schools were closed on March 16, 2020. As of April 4, 2020, individuals under the age of 20 were prohibited from going out in the streets, except for compulsory situations, for 3 months (Koca, 2020).

The COVID-19 outbreak is a problem that needs to be addressed in more than one area in terms of its effects on medical, social, political, economic, religious, and cultural fields. Although the effects of the COVID-19 outbreak on mental health are not yet fully known, based on the recent studies conducted in severe acute respiratory syndrome (SARS) and H1N1 outbreaks, it is known that infectious disease outbreaks lead to fear and anxiety, causing various psychological problems (Chan et al., 2009; Mak et al., 2010). Considering the spread of the COVID-19 outbreak to a wider area and affecting more people than other recent outbreaks, the implementation of quarantine and social isolation for the whole community in many countries in order to stop the spread, and education and work life being greatly affected, it is estimated that its effect on mental health may be greater (Rajkumar, 2020). As a matter of fact, in a recent review, quarantine applications have been reported to cause negative psychological consequences, especially symptoms of posttraumatic stress disorder (PTSD), confusion, and anger (Xiang et al., 2020). There are some differences between the psychological states of those directly affected by the outbreak and those who are not. In studies investigating psychological effects during past outbreaks, depression symptoms were reported in 3.7% of the community and in 9.6% of the affected group (those themselves or family members or friends quarantined for suspected infection) during the SARS outbreak period (Ko et al., 2006). In a recent study investigating the psychological effects of COVID-19, the anxiety and depression prevalence of those directly affected by the epidemic were determined as 12.9% and 22.4%, respectively, while those who were not directly affected were 6.7% and 11.9%. This shows that groups directly affected by COVID-19 need therapeutic services and the general public needs preventive mental health services (Lei et al., 2020). In addition, with the onset of the epidemic, there was an intense discomfoting network information such as

the hospitals all over the world will be overflowing and there will be no place for anyone and that masks or medical equipment will be insufficient, so transmission and deaths will increase. The dissemination of such information, whose source is uncertain or incomplete, has also played a role in influencing the mental health of individuals (Liu et al., 2020).

Although the number of studies conducted regarding the effects of the COVID-19 pandemic on mental health is limited, in a review of the studies conducted to date, anxiety, depression (16%–28%), and subjective stress feeling (8%) were reported among the main psychological reactions associated with pandemics (Rajkumar, 2020). In a study conducted in China that evaluated more than 1,000 people, it was shown that anxiety, depression, and harmful alcohol use was higher than normal, and mental well-being was low during the COVID-19 pandemic period. It was also reported in this study that young adults were more vulnerable in terms of mental health than older individuals (Ahmed et al., 2020).

Due to the current outbreak, the life routines of both families and children have changed. Formal education has been stopped in many countries. Due to quarantine practices and the need to increase social distance, children could not meet with their friends and relatives. In a few studies investigating the effects of the COVID-19 pandemic on children's mental health, it was stated that it is impossible for children to be psychologically unaffected in 'such a chaotic' environment (Fegert et al., 2020).

## EMDR

Psychosocial interventions have been developed, based on various psychotherapy methods, to provide essential interventions after natural disasters, such as earthquakes, floods, and epidemics, that affect a large number of people. In a meta-analysis conducted in 2017 involving 36 studies, EMDR, cognitive behavioral therapy (CBT), and narrative exposure therapies for children were compared (Brown et al., 2017). The authors concluded that each of these therapy approaches was effective compared to controls and can be recommended as a psychosocial intervention after disaster. EMDR seems to be an effective intervention for disaster-related distress (Natha & Daiches, 2014). There are also studies showing that offering EMDR treatment in a school-based environment can be an important practice to reach a large number of children quickly (e.g., Chemtob et al., 2002; Fernandez et al., 2003).

EMDR therapy was developed in 1987 by Francine Shapiro (2018) and it is widely recommended as a first-line treatment for PTSD (e.g., International Society for Traumatic Stress Studies, 2019). EMDR has been shown to be effective in many trauma-related problems (Valiente-Gómez et al., 2017). Although EMDR, which consists of eight stages, is a systematic and structured psychotherapy method applied in clinical settings, we see that some steps can be used as a stress-reduction method in recent studies (Karadag, 2020b; Shapiro, 2012). It has also been reported that basic EMDR techniques such as resource installation and safe place protocol can be used with posttraumatic stress or anxiety (Kiessling, 2005; Steinert et al., 2017; Steinert et al., 2016). Studies show that EMDR is an efficacious psychotherapy for both adults and children, and it is indicated that more studies are needed especially for children (Barron et al., 2019; Karadag et al., 2020; Matthijssen et al., 2020).

## Low-Intensity and Self-Help Techniques for Children With Anxiety

In infectious pandemic conditions such as COVID-19, it may not be appropriate to use psychosocial interventions developed for natural disasters such as earthquakes or floods. New approaches have been required, as gathering and group interventions are at risk due to the high contagiousness. It is also stated that remote intervention methods should be developed within the new approaches (Duan & Zhu, 2020; Xiang et al., 2020). For this reason, it is of great importance to establish and expand remote psychosocial interventions for individuals of all ages in order to protect mental health and minimize psychiatric problems during the pandemic period. Low-intensity interventions can be of use for these psychiatric problems. The advantages of low-intensity interventions are obvious: shorter and less time-intensive treatments are cheaper and easier to integrate into primary and community healthcare settings, or within stepped care models (Sijbrandij et al., 2020). It is very important to create easily accessible psychological intervention methods when high numbers of people are affected in earthquakes, floods, or epidemics.

The lack of a self-help protocol derived from EMDR is a major handicap. Numerous self-help interventions based on CBT have been developed. A recent meta-analysis included 50 studies ( $n = 3,396$  participants) in self-help intervention studies for children (Bennett et al., 2019). Although these low-intensity treatments were not quite as effective as high-intensity treatment, results showed a moderate positive effect, with hedges

$g = 0.49$ . Another meta-analysis (Yuan et al., 2018) specifically examined self-help interventions for children delivered through books which encouraged the application of CBT cognitive and behavioral strategies. Findings showed that bibliotherapy was significantly more effective than controls (waitlist [WL], no treatment, treatment as usual, psychological placebo).

Other types of self-help programs for children included CBT self-help delivered via a parent and computerized CBT. Forty-one children with primary anxiety disorder were assessed for anxiety severity and interference before and after receiving CBT self-help delivered via a parent (Creswell et al., 2010). The authors suggested that guided CBT self-help represents a promising treatment for childhood anxiety in primary care. Another recent study found that therapist-guided, Internet-delivered CBT was a promising low-intensity intervention for adolescents with obsessive-compulsive disorder and has the potential to increase access to CBT (Lenhard et al., 2017).

## Method

The purpose of this study was to investigate the effectiveness of an EMDR-derived self-help intervention for children to improve COVID-19 posttraumatic stress and anxiety symptoms. The intervention was delivered in a booklet guide, which was sent as a PDF document via the WhatsApp application (Karadag, 2020a). The therapist posted a video on how to apply the booklet. With their parents' assistance, the children read the guide and engaged in the 20-minute program on three occasions during a 1-week period.

## Study Design

The study was a randomized-controlled trial, comparing the outcomes of children who received the intervention to those who received no intervention. Children were divided into two equal blocks using block randomization. The parents were informed that the group was randomly divided into two blocks; one group would apply the booklet, the other group would wait and, both groups would fill in the measurement tools again at the end of the study. In addition, parents were informed that the children on the WL could apply the booklet with the exact same procedure after the study was complete.

## Procedure

Approval was obtained from Gaziantep University Local Ethics Committee (Date: 30.04.2020 No:

2020/147) and Ministry of Health Scientific Research Platform (2020-05-04T10\_18\_01) for the research. All 480 students in a state primary school in Gaziantep, Turkey, received an invitation to participate in the study, and 190 children in the second, third, or fourth grades accepted the opportunity. The informed consent form was sent online to the children and their families wishing to participate in the research. After receipt of approval, the sociodemographic data form, the State-Trait Anxiety Inventory for Children (STAIC) and the CPTS-RI were sent online to those who responded, and they were informed of their randomized group allocation.

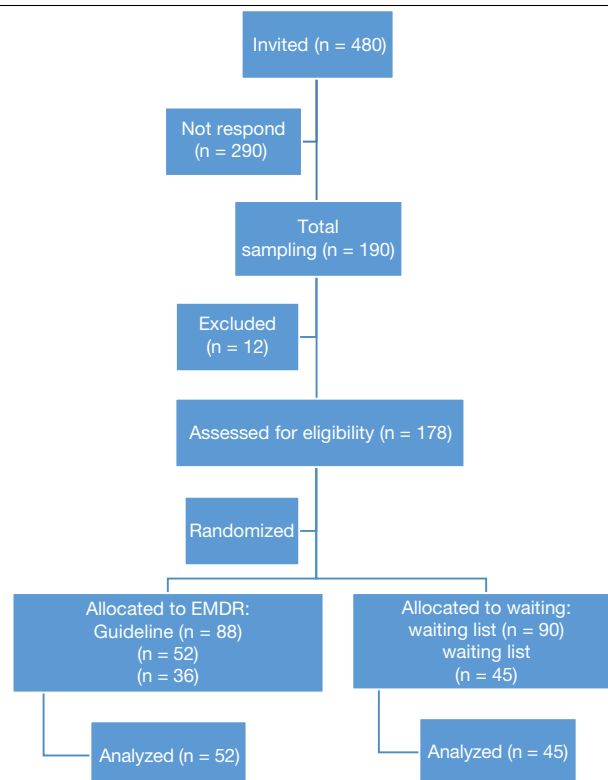
The storied EMDR-Derived Self-Help Psychological Crisis Intervention Guide was sent as a PDF document to the children in the intervention group. The intervention group carried out the activities in the guide three times in total, once every 2 days. Each session took an average of 20 minutes. The self-help intervention was done at home with the parents' assistance. After 4 weeks had passed, the intervention and WL groups were asked to complete the assessment measures. Following this, the EMDR-Derived Self-Help Psychological Crisis Intervention Guide was made available to the WL group.

## Participants

The inclusion criterion was students in second, third, or fourth grades who attended the Nuray Tuncay Kara School in Gaziantep, Turkey. The exclusion criterion was the presence of a chronic psychiatric disorder that would prevent comprehension of the test instructions, such as previously identified mental retardation or autism, or a chronic organic disorder such as diabetes or epilepsy. Invitations were sent by school online portal to the parents of 480 students. Responses were received from 190 parents. Twelve children met exclusion criteria and 178 children were enrolled in the study. Of these, 88 were randomly assigned to the intervention group and 90 to WL (see Figure 1).

## Assessment

**Sociodemographic Questionnaire.** The sociodemographic questionnaire was completed by parents. It included child's name, age, gender, grade level, number of siblings, whether the child had any chronic psychiatric or organic illnesses, their parents' ages, occupation, and if parents had any previous psychiatric illnesses. There were also questions specific to the COVID-19 outbreak, such as



**Figure 1.** Consort flow diagram of progress through the study.

“Where do you follow the news about coronavirus? Do you follow the precautions taken due to coronavirus? Is there someone with coronavirus infection detected in your family? Is there someone in your family who died due to coronavirus infection? Do you know anyone with a coronavirus infection? Do you know anyone who died due to coronavirus infection?”

**The State-Trait Anxiety Inventory for Children.** The STAIC (Spielberger et al., 1983) was completed by children. It aims to measure persistent individual differences in anxiety predisposition. The Trait Anxiety Scale consists of 20 items and the child is asked to evaluate how he/she feels “generally” and to choose the most appropriate option according to the frequency of the condition given in the item. In the State Anxiety Scale, children are asked to evaluate how they feel at the “moment” they are in and mark one of the three related options. The scale, which consists of 20 items, aims to evaluate the feelings related to state anxiety such as tension, nervousness, disturbance, and anxiety. Half of the items reflect the absence of anxiety, disturbance, and tension, and the rest reflect the existence of these situations. The highest score that can be obtained from the State Anxiety Scale is 60, and the

lowest score is 20. In the studies conducted, the cutoff value determined for the scale was determined as 45. The validity and reliability study in Turkish was performed by Ozusta (1995).

#### **Childhood Posttraumatic Stress Reaction Index.**

The CPTS-RI (Pynoos et al., 1987) was completed by children. It is used to evaluate the specific stress symptoms of school-age children and adolescents in the face of a traumatic event. The scale is one of the most common inventories used to measure posttraumatic stress responses of children and adolescents. This 20-item scale was developed by Pynoos et al. in accordance with PTSD *Diagnostic and Statistical Manual of Mental Disorders*, third edition (*DSM-III*) criteria. Total scoring ranges from 0 to 80. In addition, according to the scores obtained as a result of clinical applications, PTSD levels were determined as follows: 0–11: no PTSD, 12–24: mild PTSD, 25–39: moderate PTSD, 40–59: severe PTSD, 60 and above: very severe PTSD. The validity and reliability study in Turkish was performed by Erden et al. (1999). A “coronavirus outbreak” was written in the blank to indicate that this was the traumatic event referred to in the questionnaire, rather than other traumatic events that children may have experienced.

#### **Statistical Methods**

In the power analysis, the minimum number of participants required in each group was determined to be 21 in order to find statistical significance between the groups ( $\alpha = 0.05$ ,  $1-\beta = 0.80$ ). The compatibility of numerical data to normal distribution was tested by the Shapiro Wilk and Kolmogorov Smirnov tests. Student's t test was used to compare variables that conform to normal distribution in two groups, and the Mann–Whitney U test was used to compare non-normally distributed variables in two groups. Relationships between categorical variables were tested with the Chi-square test. In the before–after comparison of the groups, the Wilcoxon test was used in the statistics of numerical variables and ordinal data where the differences were not normally distributed, and the McNemar test was used to compare nominal variables. The SPSS 22.0 package program was used in the analysis;  $p < .05$  was considered significant.

#### **EMDR-Derived Self-Help Psychological Crisis Intervention**

The EMDR-derived self-help psychological crisis intervention guide was developed by the authors (Karadag,

2020a). The guide, called *Duru's Blue Paint Adventure*, uses a story to teach children literature-based psychoeducation, the safe place exercise, resource installation, and future template exercises (see Figure 1). In this study, it was provided as a PDF document and sent via the WhatsApp application. All the steps done by the children were done in the company of parents. The procedure took 20 minutes and was done three times over a 1-week period.

The booklet consists of four stages. The first stage is psychoeducation, the second is the Butterfly Hug (Artigas et al., 2000) and resource installation exercise (Korn & Leeds, 2002), the third is the safe place exercise (Berger & Lahad, 2010), and the fourth is the future template.

#### **Psychoeducation**

Psychoeducation teaches themes such as the identification of the virus, its externalization by finding a nickname, and the importance of hand washing and social isolation.

#### **Butterfly Hug**

During EMDR therapy, clients focus on memories, thoughts, emotions, sensations, and/or visualizations while engaging in dual attention bilateral stimulation (BLS). In this protocol, the Butterfly Hug (Artigas et al., 2000) was used as a self-administered form of BLS. It involves the client crossing the arms and tapping on left and right shoulders in an alternating manner (see Figure 2).

Duru'nun anlattıkları bitince annesi oyuna devam etmiş.

“Hadi bu güzel hayalimizi düşünelim ve kendimizi kucaklarken ellerimizle bir sağ bir sol omuzumuza yavaş yavaş pıt pıt yapalım.” demiş.



**Figure 2.** “Picture of Butterfly Hug and Resource Installation. After Duru had described her resource, her mother continued to play. She said that “Let’s think about our beautiful dream and gradually tap one right and then one left shoulder while hugging ourselves.”

## Resource Development and Installation Protocol

In this exercise, positive images, memories, or symbols are strengthened with the Butterfly Hug. The goal is to draw the child's attention to her/his potential ego strength. The scenario of the resource development and installation protocol for the child was modified from the Korn and Leeds (2001) protocol and is as follows:

**Step 1: Defining the resources.** The child was asked, "How would you like to feel in annoying situations?" The moments and images when he/she previously felt strong or happy were identified, detailed, and visualized. Figures such as family and friends that would strengthen the resource memory were imagined.

**Step 2: Developing the resource.** When he/she thought about that positive moment, he/she was asked how he/she felt, what he/she heard, what had changed in her/his body.

**Step 3: Installing the resource.** The positive sensations when he/she thought of that moment were installed with four to six short and slow BLS sets. Then, "What do you notice now?" was asked.

**Step 4: Strengthening the resource.** If positive materials were reported, strengthening was done by installing these once more. But if the negative material came up, another resource exercise was done.

**Step 5: Cue word.** He/she was asked the word he/she wanted to use to remember the resource. After finding the word that suited him/her, it was installed with four to six short and slow BLS sets.

## Safe Place Protocol

The aim of this exercise is to create an imaginary space that the child can use at any time to access any positive source and ensure that his/her intense emotional experiences are covered and soothing. The scenario of teaching the child a safe place protocol is as follows:

**Step 1: Image.** The child was asked, "Can you think of a real or imaginary place where you feel safe/comfortable/peaceful or happy? What does this place feel like most?"

**Step 2: Emotions and sensations.** The child was asked, "Think of a safe/comfortable/peaceful place. What do you feel? Where do you feel the feeling of . . . in your body?"

**Step 3: Development.** The child was told, "Think about the . . ., image, remember the feeling of . . ., and this feeling in your body wherever you feel."

She/he was asked to perform four to six slow BLS by themselves using the Butterfly Hug Technique. If positive sensations were experienced, they were asked to repeat the application.

**Step 4: Cue word.** He/she was asked to find cue words to remember to use the safe place later when he/she felt troubled. She/he identified cue words and positive sensations experienced with the safe place, and these were matched via BLS.

**Step 5: Encouragement.** The child was encouraged to use safe place exercise and the cue word in cases of discomfort.

## Future Template

The future template is part of EMDR therapy's standard procedures, with the purpose of preparing the client for future stressful situations. In this protocol, the child visualizes using her/his own safe place and resources, developed in this protocol, to manage when she/he feels distressed in the future. The scenario is as follows:

**Step 1:** If something bad happened tomorrow, the next day, or next week and you wanted to use this thought, how would you cope in that situation?

**Step 2:** Think of all its smells, sounds, emotions, and the sentence . . .

**Step 3:** Coping method was installed with four to six short and slow BLS sets.

## Results

### Demographic and Prevalence Characteristics (N = 178)

The data of all 178 children who agreed to participate in the study were analyzed to reveal the mental health status of healthy children; they were all unable to leave their homes during the study period because of COVID-19 (see Table 1). The average age of the children was 9.07 years ( $\pm 0.8$ ); the female/male ratio was 55.1%/44.9%. Also, 3.4% of the participants had previously sought treatment at a psychiatric clinic (four children due to attention deficit hyperactivity disorder, one child due to anxiety disorder, and the other due to enuresis nocturna). While 97.2% of families were following the current COVID-19 news with any means of communication, television (70.8%) was the most common. Two (1.12%) of the cases stated that they partially complied with the measures taken by the state due to COVID-19, while the rest reported that they fully complied.



**TABLE 1. The Demographic and Prevalence Characteristics of All 178 Participants**

Age	9.07 ( $\pm 0.8$ )
Gender	
Girl	98 (55.1%)
Boy	80 (44.9%)
Grade	
Second	51 (28.7%)
Third	62 (34.8%)
Fourth	65 (36.5%)
Predetermined psychiatric disorder	
Yes	6 (3.4%)
No	172 (96.6%)
Mean mother's age	37.7 ( $\pm 4.12$ )
Mother's occupational status	
Working	123 (69.1%)
Not working	55 (30.9%)
Mother's education status	
Primary school	14 (7.9%)
Secondary school	7 (3.9%)
High school	23 (12.9%)
University	119 (66.9%)
Doctor of philosophy	15 (8.4%)
Mean father's age	41.3 ( $\pm 4.59$ )
Father's occupational status	
Working	176 (98.9%)
Not working	2 (1.1%)
Father's education status	
Primary school	5 (2.8%)
Secondary school	7 (3.9%)
High school	22 (12.4%)
University	128 (71.9%)
Doctor of philosophy	16 (9%)
COVID-19 data following	
Not following	5 (2.8%)
Television	126 (70.8%)
Internet	29 (16.9%)
Socialmedia	18 (10.1%)
Mean (CPTS-RI) scores	20 ( $\pm 12.64$ ; min: 1 max: 68)

(continued)

Above threshold PTSS	
Yes	136 (76.4%)
No	42 (23.6%)
CPTS-RI category	
No PTSS	42 (23.6%)
Mild PTSS	74 (41.6%)
Medium PTSS	47 (26.4%)
Severe PTSS	14 (7.9%)
Very severe PTSS	1 (0.6%)
Mean STAIC state anxiety scores	32.6 ( $\pm 9.5$ ; min: 20 max: 59)
STAIC state anxiety category	
Low anxiety	156 (87.6%)
High anxiety	22 (12.4%)
Mean STAIC trait anxiety scores	39.4 ( $\pm 8.01$ ; min: 22 max: 58)
STAIC trait anxiety category	
Low anxiety	147 (82.6%)
High anxiety	31 (17.4%)

*Note.* CPTS-RI = Childhood Posttraumatic Stress Reaction Index; STAIC = the State-Trait Anxiety Inventory for Children; PTSS = posttraumatic stress symptoms.

It was apparent that the children were impacted by COVID-19. The mean CPTS-RI score was 20, above the cutoff value of 12. In addition, in the categorization made according to the cutoff value, 76.4% of the cases showed posttraumatic stress symptoms above the threshold. At the time of filling the data, only three children (1.68%) reported that COVID-19 infection was detected in an acquaintance and none reported that a family member had COVID-19 infection or had died due to COVID-19 infection.

### Attrition

After randomization, the intervention group received EMDR treatment during the first week and the WL received no treatment. Four weeks later the posttreatment measures were administered to both groups. There were high rates of attrition in both groups, and 40.9% ( $n = 36$ ) of the EMDR intervention group and 50% ( $n = 45$ ) of the WL group did not complete the posttreatment measures.

An analysis was conducted to see if there was any difference between the treatment completers and those who dropped out of the study. This analysis



**TABLE 2. Study Completers: Comparison of EMDR and WL for PTSD and Anxiety Scores at Pre- and Posttreatment**

	Pretreatment		Posttreatment		EMDR vs WL at posttreatment
	EMDR intervention (n = 52)	WL (n = 45)	EMDR vs WL at pretreatment	WL (n = 45)	
Median CPTS-RI scores	18.5 (min: 5 max: 57; 95% CI: 18.1–24.6)	20.8 (±12.9; 95% CI: 17–24.6)	p = .866 <sup>a</sup>	14 (min: 3 max: 52; 95% CI: 14.9–22.8)	p = .006 <sup>a</sup>
Mean CPTS-RI scores and SD					
Above threshold PTSS			p = .480 <sup>b</sup>		p = .037 <sup>b</sup>
Yes	41 (78.8%)	32 (71.1%)		23 (44.2%)	29 (64.4%)
No	11 (21.2%)	13 (28.9%)		29 (55.8%)	16 (35.6%)
CPTS-RI category			p = .737 <sup>a</sup>		p = .006 <sup>a</sup>
No PTSS	11 (21.2%)	13 (28.9%)		29 (55.8%)	16 (35.6%)
Mild PTSS	28 (53.8%)	13 (28.9%)		21 (40.4%)	17 (37.8%)
Medium PTSS	6 (11.5%)	16 (35.6%)		1 (1.95%)	6 (13.3%)
Severe PTSS	7 (13.5%)	3 (6.7%)		1 (1.95%)	6 (13.3%)
Very severe PTSS	0 (0%)	0 (0%)		0 (0%)	0 (0%)
Mean STAIC state anxiety scores and SD	32.1 (±9.1; 95% CI: 29.7–34.8)	32.2 (±7.7; 95% CI: 29.1–34.5)	p = .977	28.5 (±8.3; 95% CI: 27.2–31.7)	29 (±9.9; 95% CI: 28.5–34.9)
STAIC state anxiety category			p = .082		p = .185
Low anxiety	46 (88.5%)	44 (97.5%)		48 (92.3%)	38 (84.4%)
High anxiety	6 (11.5%)	1 (2.2%)		4 (7.7%)	7 (15.6%)
Mean STAIC trait anxiety scores and SD	36.9 (±7.9; 95% CI: 34.8–39.1)	35.5 (±8.07; 95% CI: 33.2–37.9)	p = .395	34.6 (±6.7; 95% CI: 32.7–36.5)	34.2 (±9.8; 95% CI: 31.2–37.1)

(continued)

**TABLE 2. Study Completers: Comparison of EMDR and WL for PTSD and Anxiety Scores at Pre- and Posttreatment (Continued)**

	Pretreatment		Posttreatment		EMDR vs WL at posttreatment
	EMDR intervention (n = 52)	WL (n = 45)	EMDR vs WL at pretreatment	EMDR intervention (n = 52)	
STAIC trait anxiety category			$p = .166$		$p = .190$
Low anxiety	40 (76.9%)	39 (86.7%)		47 (90.4%)	37 (82.2%)
High anxiety	12 (23.1%)	6 (13.3%)		5 (9.6%)	8 (17.8%)

*Note.* CI = confidence interval; C/PTS-RI = Childhood Posttraumatic Stress Reaction Index; STAIC = the State-Trait Anxiety Inventory for Children; PTSS = posttraumatic stress symptoms; SD = standard deviation; WL = waitlist.

<sup>a</sup>Mann-Whitney U test was used. <sup>b</sup> Student's t test was used.

found that there was no statistically significant difference in terms of posttraumatic stress symptoms (PTSS), state and trait anxiety between the treatment completers, and those who dropped out of the study ( $t(86) = -0.845, p = .400$ ;  $t(86) = -0.777, p = .439$ ;  $t(86) = 0.817, p = .416$ , respectively).

### Comparison of Intervention and WL Conditions

**Preintervention.** Analysis of the full sample ( $n = 178$ ) at preintervention found no statistically significant difference between the EMDR intervention ( $n = 88$ ) and WL ( $n = 90$ ) groups in terms of age, grade level, average parental ages, mean CPTS-RI score, CPTS-RI category, above threshold PTSS, mean STAIC state anxiety scores, STAIC state anxiety category, mean STAIC trait anxiety scores, and STAIC trait anxiety category.

Because of the large dropout, an analysis was conducted of the completer sample ( $n = 97$ ) at preintervention to determine if there was any difference between the two conditions at that time. It found only one statistically significant difference between the preliminary test results—the WL completers were younger than the treatment completers,  $t(95) = -3.287, p = .001$ ). Children in the EMDR group had a mean age of 9.23 ( $\pm 0.8$ ; 95% CI: 9–9.4) and those in WL had a mean age of 8.78 ( $\pm 0.67$ ; 95% CI: 8.6–9).

**Postintervention.** Analyses were conducted to compare within-subject pre–post changes for each of the EMDR and WL groups. Analyses were also conducted to compare between-subjects scores at posttreatment, comparing scores in the EMDR and WL conditions.

In the analysis comparing EMDR intervention and WL scores at the end of the study, there were significantly lower trauma scores for the EMDR group compared to WL. The EMDR group showed significantly lower scores for median CPTS-RI, CPTS-RI category, and above threshold PTSS. There was no significant difference between the groups for anxiety in terms of median STAIC state anxiety scores, STAIC state anxiety category, mean STAIC trait anxiety scores, and STAIC trait anxiety category values (see Table 2).

In the within-subjects' comparison of prestudy versus poststudy results, a statistically significant improvement was found in the EMDR intervention group for all measures except state anxiety. These effects included median CPTS-RI ( $p < .001$ ), above threshold PTSS ( $p < .001$ ), CPTS-RI category ( $p < .001$ ), median STAIC ( $p = .012$ ), and STAIC trait anxiety

category values ( $p = .016$ ). According to these results, there was an improvement in the trauma scores, a decrease in the number of cases showing PTSS above threshold, and a decrease in the number of cases showing severe, medium, and mild PTSS after intervention in the EMDR intervention group. There was also a decrease in state anxiety symptoms and a decrease in the number of children who scored above trait anxiety cutoff values in the EMDR condition.

For children in the WL group, there was no statistically significant pre–post improvement in either posttraumatic anxiety symptom levels. Instead, there was a significant increase in the number of children with high anxiety symptoms:  $t(40) = 2.246, p = .031$ . While 2.5% of WL children showed high state anxiety before the study, the percentage had increased to 15.6% after the waiting period (see Table 2).

### Discussion

In our study, the children who participated in the EMDR-derived self-help intervention showed a significant decrease compared to WL on the three trauma measures at posttreatment. The analyses which compared the children's pre- and postscores showed significant improvement on all measures except for state anxiety. These changes had moderate to large effect sizes. In comparison, the WL children showed no significant improvements, and instead showed a significant increase in state anxiety between pre- and postintervention. It appears that the EMDR children experienced a substantial benefit from treatment.

During the 4-week study period, the number of COVID cases in the city continued to rise. At the beginning of the research, while the number of cases in the city and the duration of stay at home were shorter, a rapid increase in cases occurred in the past 2 weeks. In addition, prolonged stay at home may have played a role in the increase in anxiety (Brooks et al., 2020). This may be the reason why the WL children showed an increase in state anxiety.

### COVID-19-Related Distress

In our study, 76.4% of the 178 children reported pandemic-related posttraumatic stress symptoms that were higher than the PTSS cutoff. The information about the psychological effects of the ongoing COVID-19 pandemic in children and the methods of intervention related to the reduction of its effects is rather limited (Ahmed et al., 2020). This was similar in the previous SARS-CoV pandemic (Lee et al., 2007). Considering the potential severe illness caused

by COVID-19 and risk of mortality, quarantine practices, emotional difficulties caused by social isolation, deterioration of life routine, a sense of uncertainty caused by reconditeness, and unpredictability of the process, it can be said that the pandemic process caused a stressful situation. So, this is a predictable result, as it is a condition seen in previous studies that children are more affected by traumatic events (Herringa, 2017). Since the current situation is mostly symptoms of acute stress disorder, it is possible that a smaller percentage will progress to develop a chronic psychiatric disorder (Bryant, 2003). However, it still seems to be a remarkable situation and intervention is strongly recommended as many are highly affected.

### EMDR Therapy With Children

Evidence that EMDR is an effective therapy in the treatment of children's psychological problems is increasing day by day (Meentken et al., 2018; Natha & Daiches, 2014). There is some evidence for EMDR-derived techniques, used as low-intensity interventions, to reduce stress in cases of collective trauma. In a study conducted in 2019, it was reported that the safe place protocol reduced the anxiety levels of the clients and facilitated the processing of traumatic materials (Tripp et al., 2019). The safe place program performed with more than 6,000 children in 110 Israeli kindergartens after the Second Lebanon War was shown to improve children's coping skills and strengthen their psychological resilience (Berger & Lahad, 2010). These findings are similar with ours.

### Self-Help Interventions

As far as we are aware, this is the first study to research an EMDR-derived self-help intervention for children. This article addresses an important area—the value of self-help EMDR-derived treatment for children. As you know, low-intensity interventions make treatment more accessible and available to many more individuals, especially for low- and middle-income countries (Bockting et al., 2016). This randomized-controlled trial found that a self-help intervention derived from EMDR can be an effective low-intensity intervention in children. Although a self-help intervention specific to COVID-19 has not been found in the literature review, it has been shown that such protocols are effective in massive events in earthquake studies (Başoğlu et al., 2009). A study with anxious children published in 2017 (Creswell et al., 2017) compared brief, guided, parent-delivered CBT

and solution-focused brief therapy, with results showing no difference in treatment outcomes. However, Creswell et al. noted that guided parent-delivered CBT is likely to be a cost-effective alternative to solution-focused brief therapy and might be considered as a first-line treatment for children with anxiety problems. In the brief, guided, parent-delivered intervention, parents received support from therapists in four 45-minute face-to-face sessions and four 15-minute telephone reviews. One of the biggest problems in self-help interventions is the high level of attrition (Hermes et al., 2019). As a matter of fact, a high attrition rate was found in our study. Further research is needed to study these high dropout rates so that they can be reduced.

### Limitations

There were some limitations in our research. The first limitation is that safety was not assessed. We did not collect any data on how the children and their parents experienced the treatment, and whether any child reported negative results.

We had high levels of attrition, 45.5%. The high dropout rate may limit the representativeness of the sample. However, we note that dropout was not significantly different between the two conditions and that the dropout occurred during a major pandemic on an unprecedented scale. Also, attrition tends to be high in self-help studies, especially those like ours in which there is no therapist contact (Harris et al., 2019). The other limitation of the study is that the follow-up time was short, and studies with longer follow-up time are needed.

### Conclusion

In our study, posttraumatic and anxiety effects in children were found to be high during the COVID-19 outbreak, and an EMDR-derived self-help technique appeared to be effective in reducing these symptoms as a psychosocial intervention tool.

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