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Comparative effect of in-person and virtual methods of eye movement desensitization and reprocessing on the fear of COVID-19 among nurses: a three-armed randomized control trial

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ABSTRACT

During the COVID-19 pandemic, the fear of COVID-19 increased, especially among nurses. The present study investigated the effect of in-person and virtual methods of Eye Movement Desensitization and Reprocessing (EMDR) on the fear of COVID-19 among nurses. In a three-armed randomized control trial, the sample comprised 141 nurses working in hospitals affiliated to Qazvin University of Medical Sciences, Qazvin, Iran. Eligible individuals were randomly assigned in study groups (virtual EMDR, in-person EMDR, and control) using balanced block method with a block size of six. The main outcome of the study was the fear of COVID-19 assessed before, immediately after, and three months after intervention. The secondary outcomes assessed included anxiety, depression and work-related quality of life assessed before and three months after the intervention. The results of variance-covariance analysis for repeated measures showed a significant reduction in the mean score fear of COVID-19 immediately after and three months after the intervention in the in-person EMDR intervention group compared to the virtual group (mean difference equal to -3.48 and -3.57) and the control group (mean difference equal to -5.45 and -5.57). Considering the minimum clinically significant difference was equal to 2.54 on the Fear of COVID-19 Scale, this reduction was also clinically significant. The average number of intervention sessions was two. No significant difference was observed regarding anxiety, depression and work-related quality of life after intervention between all three groups. In-person EMDR is more effective than the virtual EMDR as a non-pharmacological method in the treatment of fear of COVID-19 among nurses. In-person EMDR should be conducted in preference to virtual EMDR. However, in situations where in-person EMDR cannot be conducted, virtual EMDR could be considered as a potential alternative.

HIGHLIGHTS

- In-person EMDR treatment was more effective in reducing the fear of COVID-19 compared to virtual EMDR and control groups.
- Despite slight decrease of FCV-19S scores among the virtual EMDR group vs. control, it was not clinically significant.
- The therapeutic results of the in-person EMDR vs. virtual EMDR were obtained over a short period of time (in many cases just two sessions).

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SUBJECTS
Allied Health; Health Conditions; Nursing

Introduction

The coronavirus disease-2019 (COVID-19) began to spread widely around the world after its initial discovery in Wuhan (China) in December 2019 (Suryakumari et al., 2022). Like other countries, Iran (where the present study was carried out) suffered greatly during the COVID-19 pandemic (Hosseini et al., 2020). The contagiousness of COVID-19 caused a change in the psychological response among individuals (Amin, 2020). Fear of COVID-19 was commonly the first reaction of people when they first heard about the disease (Kayis et al., 2022). Such fear comprised different aspects such as the fear of (i) contracting a disease, (ii) death, (iii) losing relatives

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and loved ones, and (iv) infecting others through the transmission of the disease (Kayis et al., 2022). Nosophobia is the uncontrollable and persistent fear of having a severe medical condition (Szczurek et al., 2021). Consequently, nosophobia increased during the pandemic especially because COVID-19 infected and killed millions of people globally, and because there was so much information (and misinformation) about the disease (Heiat et al., 2021). Nosophobia was especially prevalent among medical staff and healthcare workers, including the nurses (Ilyas et al., 2024). Fear of COVID-19 plays a significant role in causing psychological disorders such as anxiety, depression, and sleep problems (Alimoradi et al., 2022; Chalhoub et al., 2022). Fear of COVID-19 was associated with increased perceived job insecurity, organizational and professional turnover intentions, and decreased job satisfaction (Rajabimajd et al., 2021).

Restrictions and the imposition of home quarantine during the COVID-19 pandemic caused many psychological problems including anxiety, depression, mood instability, reduced mental abilities, sleep problems, lack of motivation, fear of contracting COVID-19, sadness, feelings of isolation, confusion, and fear of infection in different sections of Iranian society (Alizadeh et al., 2020).

Like all individuals, those working in the healthcare system, especially nurses, were also afraid of COVID-19 and this fear affected their work performance. Because of the many tasks of providing care to patients, especially those suffering from COVID-19, the long duration of contact with patients, the high contagion of the disease, as well as the lack of effective protective equipment and the high lethality of the disease, nurses suffered fear of infection, anxiety, and depression (Kayis et al., 2022). According to a recent systematic review, the pooled prevalence of COVID-19 among healthcare workers was 7% to 16% diagnosed based on the polymerase chain reaction (PCR) method for detecting COVID-19 (Dzinamarira et al., 2021). This significant rate of COVID-19 infection among healthcare providers (including nurses) had psychological impacts including stress, anxiety, depression, and fear (Dzinamarira et al., 2021). This caused increased fear among nurses irrespective of their working departments (i.e. nurses working in non-COVID-19 departments were as afraid as those working in COVID-19 departments) (Khattak et al., 2021; Labrague & de Los Santos, 2021).

Studies have indicated that the fear of COVID-19 led to depression and anxiety, as well as increased suicidal thoughts and decreased work efficiency among nurses and medical staff in the Philippines, Iran and Turkey (Aziziaram & Basharpoor, 2020; Labrague & de Los Santos, 2021; Sheikhi et al., 2022; Ünver & Yeniğün, 2021). During the first outbreak of COVID-19 in Iran, 56.6% of health workers experienced moderate to severe symptoms of anxiety and fear, and 42.3% experienced moderate to severe symptoms of depression. Fear and anxiety was higher among women and those aged 30 to 39 years (Hassannia et al., 2020; Shoja et al., 2020). Considering the significant consequences of fear, including the increase in suicide and anxiety and the decrease in nurses' work efficiency, treating anxiety and fear is necessary (Ariapooran & Amirimanesh, 2020; Zandifar & Badrfam, 2020).

There are various pharmacological and non-pharmacological methods to reduce fear-related anxiety and phobias (Davis et al., 2006; Herrmann, 1997). Medications such as selective serotonin reuptake inhibitors, serotonin and noradrenaline reuptake inhibitors, tricyclic antidepressants, and monoamine oxidase inhibitors are used to reduce the symptoms of fear-related anxiety and phobias, but the treatment of choice is behavior therapy, specifically those involving desensitization methods (Roy-Byrne & Cowley, 2002). Desensitization methods are preferred to treat specific phobias, because when a fear memory is formed, some fear-related stimuli are shaped. These stimuli are connected to the concepts of danger and activate panic and the sympathetic nervous system-related physiological reactions (Böhnlein et al., 2020). However, when medications are used only to treat the symptoms of fear and phobia (without alleviating the source of problem), this might have side effects and are contraindicated for some groups (such as those using anti-coagulant medication and/or diuretics, patients with glaucoma, patients with cardiac disease) (Böhnlein et al., 2020). Behavioral therapy targets the fear memory and exposes the client to the source of the fear and is often considered as the first therapeutic choice (Wolitzky-Taylor et al., 2008).

Eye movement desensitization and reprocessing (EMDR) is a structured therapy for stress that was developed in the 1980s by Francine Shapiro (Shapiro, 2001). The key component of EMDR is for individuals to recall a fear or a traumatic incident or memory while they move their eyes horizontally from side to side. It is claimed that this process removes traumatic memories or reduces negative and ineffective thoughts. The neurobiological foundations of EMDR are based on this, and it changes implicit sensory information to consolidated explicit information (Muris et al., 1998). In EMDR, after each set of eye

movements, the patient briefly reports on their set of thoughts, images, and feelings until a negative emotion or memory of hurt or disgust emerges. The therapist then encourages the patient to process the disturbing memory or topic in a functional way to bring about change (Pomeri et al., 2020; Ricci et al., 2006). In previous studies, promising effects of EMDR have been reported in overcoming various fears such as fear of hypoglycemia among type 2 diabetes patients (Sheikhi et al., 2020), fear of flying (Triscari et al., 2011), and choking phobia among children and adolescents (de Roos & de Jongh, 2008).

During the COVID-19 pandemic, the need to treat and reduce fear and anxiety was needed for many individuals, especially nurses and other healthcare staff (Saint-Jammes et al., 2022). Although there was an increased need for mental healthcare services during the pandemic, individuals' access to these services was limited due to COVID-19 related control measures such as lockdowns, quarantines, and social distancing policies (Buffel et al., 2022; World Health Organization, 2021). To overcome this problem, virtual forms of mental healthcare provision were implemented such as video-conferencing and telephone-conferencing (Ganjali et al., 2022), guided or unguided internet-based psychotherapy, and psychosocial support mobile applications and web applications (Richardson et al., 2020). A recent umbrella review examining remote mental healthcare interventions during the COVID-19 pandemic reported that mental health services mainly adapted to this unprecedented situation by implementing synchronous tele-mental health tools which facilitated continuity of care by proving flexible scheduling (Witteveen et al., 2022).

EMDR was one of psychotherapeutic methods adapted to be provided virtually during COVID-19 pandemic (Farrell et al., 2023; Fisher, 2021; Liou et al., 2022; O'Shea Brown, 2021). In a randomized control trial comprising 34 mental health clinicians, the efficacy of Self-Care Traumatic Episode Protocol (STEP), an adapted computerized EMDR for mental health clinicians, was evaluated. The results showed a significant decrease in depression, anxiety, and stress both immediately and one week after EMDR treatment (Moench & Billsten, 2021). Single session tele-intervention EMDR has shown promising results in improving emotional state and decreasing perceived disturbance among healthcare providers who cared COVID-19 patients (Tarquinio et al., 2021). Moreover, given that it is possible to save time and money with advancing computer technology, EMDR can now be presented virtually through computer systems (Yurtsever et al., 2022). Given these innovative technological advancements, the aim of the present study was to evaluate the efficacy of virtual EMDR versus in-person EMDR (both compared to controls) in reducing the fear of COVID-19. In present study, it was hypothesized that both EMDR methods (in-person and virtual) would reduce the fear of COVID-19 among nurses compared to controls.

Method

Study design

The present study was a three-armed randomized controlled trial. Study groups included an in-person EMDR group, a virtual EMDR group, and a control group. The study was prepared adhering the CONSORT reporting guidelines (Moher et al., 2012).

Participants

Nurses working in the teaching hospitals of Qazvin University of Medical Sciences were invited to participate in the study if they had a bachelor's degree in nursing or higher, worked in the COVID-19 department for at least six months (this criterion was set to ensure including nurses who had enough experience of working with COVID patients as a frontline healthcare provider. The chance of having fear a fear of COVID-19 was higher in this group (Moradi & Sharififar, 2022), and gave their full informed consent to participate in the intervention. The exclusion criteria were (i) having a diagnosed chronic mental illness (e.g. anxiety, depression, etc.), (iii) having a visual impairment, (iii) currently using anti-depressants, anxiolytics and/or anti-psychotics, and/or (iv) receiving other psychoeducational interventions. Figure 1 provides the study's CONSORT flow diagram.

Sample size estimation

The sample size was calculated using *G-Power* software considering (i) an effect size of 0.7 based on the result of the meta-analysis by Sepehry et al. (2021) in estimating the effect size of EMDR for depression, (ii) the first type error being equal to 0.05, and (iii) the second type error being equal to 0.20. Consequently, the sample size was estimated to be 48 individuals in each group. Taking into account the possibility of 10% sample dropout during the implementation of EMDR intervention, 53 individuals were invited to the study for each group (Luo et al., 2021; Proudlock & Peris, 2020).

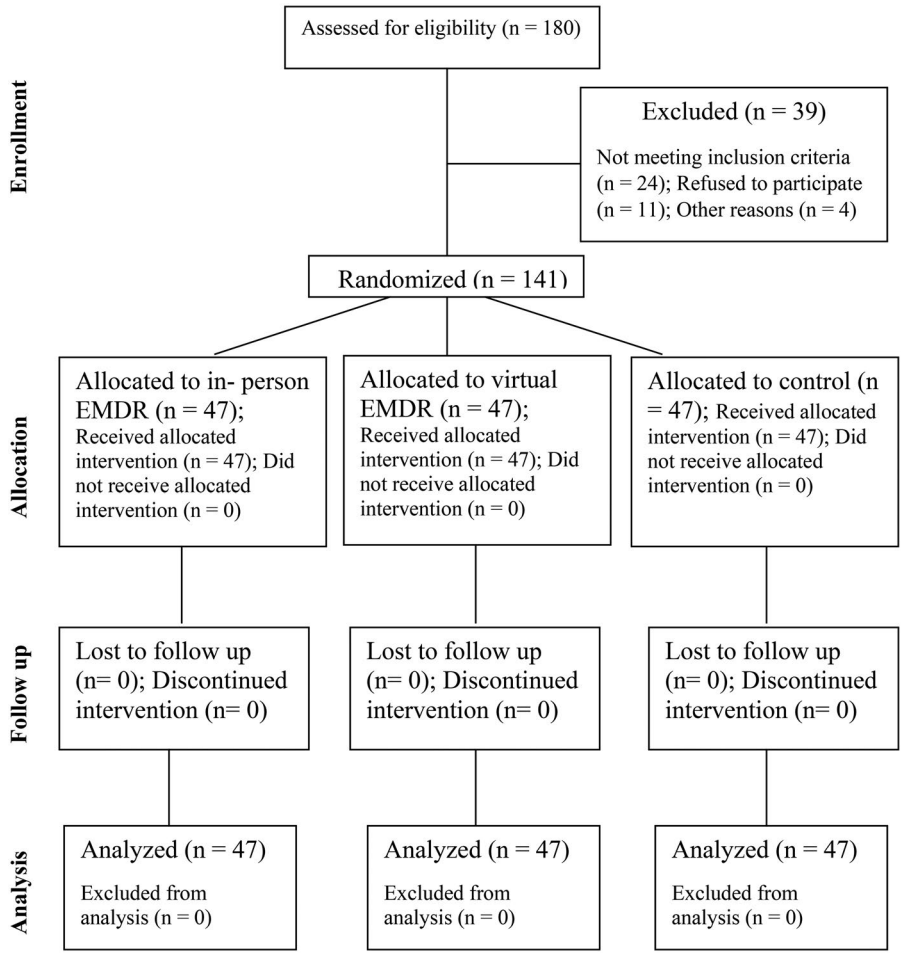

Figure 1. CONSORT flow diagram.

Random allocation method

Eligible individuals were assigned into study groups using the balanced blocks randomization methods with a block size of six. Random sequence was generated using online random generator websites.

Study variable measures

Demographic characteristics

This checklist was developed by the research team and included questions regarding the variables of gender, age, marital status, education level, work experience in the healthcare field, work experience in the COVID-19 department, history of COVID-19 disease, and whether they were taking any medications for psychiatric conditions.

Fear of COVID-19 Scale (FCV-19S)

The seven-item FCV-19S (Ahorsu et al., 2022) was used to assess the fear of COVID-19. Each item (e.g. '*I am afraid of COVID-19*') is rated using a five-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The total scores range from 7 to 35 and a higher score indicates greater fear of COVID-19. The validity and reliability of the Persian FCV-19S has been confirmed (Ahorsu et al., 2022).

Subjective units of distress scale (SUDS)

The single-item SUDS was used to assess the degree of distress at each stage of treatment. The scale was developed to be used in clinical practice of behavioral therapy techniques (Wolpe, 1990). The scores range between 0 (*no distress*) and 10 (*maximum distress*) (Shapiro, 2018). The SUDS score is a necessary procedural outcome of EMDR protocol which assess the patient's negative feelings during treatment and the continuation of EMDR treatment sessions are decided based on change in the SUD scores (Wolpe, 1990).

Hospital anxiety and depression scale (HADS)

The 14-item HADS (Zigmond & Snaith, 1983) was used to assess anxiety and depression. The scale comprises two seven-item subscales (anxiety and

depression). Each item (e.g. '*I have lost interest in my appearance*') is rated using a four-point scale from 0 (*not at all*) to 3 (*very often*). Total scores on each subscale range from 0 to 21 and higher scores indicate greater anxiety and depression (Zigmond & Snaith, 1983). The validity and reliability of the Persian HADS has been confirmed (Montazeri et al., 2003).

Work-related quality of life scale (WRQLS)

The 24-item WRQoLS was used to assess work-related quality of life. It comprises six subscales (i.e. general well-being, home-work interface, job-career satisfaction, control at work, working conditions, and stress at work). Each item (e.g. *'I work in a safe environment'*) is rated using a five-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*) with possible scores ranging from 24 to 120 (Easton & Van Laar, 2018; Van Laar et al., 2007). The validity and reliability of the Persian version has been confirmed (Mazloumi et al., 2017).

Intervention program

As aforementioned, EMDR is a therapeutic approach developed by Shapiro to reduce stress caused by psychological trauma. In this approach, it is believed that individuals benefit from an internal self-regulating system that comes into action when faced with psychological damage and helps to preserve the individual (Morris et al., 2023). Psychological damage occurs when traumatic events in life disrupt this self-regulating system, disable the information processing system, and cause the formation of pathological patterns in cognition, behavior, and feelings. Accordingly, when individuals need to process and analyze information in order to protect themselves, these pathological structures overcome the individual and cause self-destructive behaviors. In this type of psychotherapy, the self-regulating system is corrected, and the emergence of positive and constructive behaviors and thoughts are facilitated. What is important in this approach is that the traumatic experiences of childhood have not been processed. In the later periods of life these experiences take away the opportunity to think, feel, and behave in a healthy way. In this therapeutic method, Shapiro proposed a standard eight-step model, in which the self-regulation system of individuals is reactivated by using rapid eye movements and reviving childhood experiences, and then analyzing and reprocessing them (Shapiro & Forrest, 2001). In some cases, it is possible that several of the eight steps can be included in one treatment session.

i. In the first step, the patient's history is taken, the treatment is designed, and the patient is prepared for evaluation. The first step or evaluation includes determining the goal and the baseline responses, which are assessed by the therapist's comments on the scale of individual distress.
ii. In the second step, before starting the EMDR treatment for the first time, the patient is advised to identify a safe place, image or memory in which they feel calm and comfortable, so that when they experience unpleasant feelings, they imagine them and are able to tolerate the unpleasant feelings (Elledge, 2021).
iii. The third step of EMDR is the desensitization stage, which targets the patient's disturbing emotions.
iv. The fourth step includes work focused on cognitive reconstruction and reprocessing (installation stage).
v. The fifth step evaluates the remaining physical tensions (physical scanning stage).
vi. The sixth step is the termination or closure phase, which involves debriefing and is mainly designed to balance the patient between sessions and is reassessed at the end.
vii. The seventh step is where the therapist provides appropriate information and adequate support to the patient
viii. The eighth step is the re-evaluation stage. The purpose of this step is to ensure that all relevant old incidents are processed (Solomon & Rando, 2012).

The first step included taking the client's history, designing the treatment, preparing the client and assessing the client. The second step consisted of learning about the EMDR process through primary memory stimulation. The participant was asked to visualize a scene or a memory about COVID-19 that disturbed and worried them. In the third step, before starting the EMDR treatment for the first time, the participant was taught to identify a safe place, image or memory where they felt calm and comfortable, so that when they experienced unpleasant feelings, they could imagine it and feel able to tolerate unpleasant feelings. The fourth step was the desensitization stage, which targeted the participant's disturbing emotions. The fifth step was the implementation stage, which focused on cognitive restructuring and reprocessing (installation stage). The sixth step was devoted to the evaluation of the remaining physical tensions and their evaluation. This is called physical scanning. The seventh step is the

finishing and closing stage, which was to ensure the stability of the participant at the end of the EMDR sessions. In the eighth step, the therapeutic effect of EMDR is re-evaluated to ensure that no more EMDR sessions are needed.

Sessions in the in-person EMDR method

The EMDR sessions comprised at least two sessions of 45 to 60 minutes twice a week and were carried out in the hospitals affiliated to Qazvin University of Medical Sciences. The sessions took place in a suitable and quiet atmosphere to focus on the intervention for the nurses. Eye movements in this method were guided by movement of the therapist's finger.

Sessions in the virtual EMDR method

In the virtual method, all steps were similar to the in-person method except that the therapist was online rather than with the person physically, and eye movements were guided using the movement of the ball on a laptop screen.

Control group

Participants in control group did not receive any intervention during study period. However, after completion of study, they were offered in-person or virtual EMDR if they wanted.

Number of treatment sessions

In EMDR, the number of sessions were determined based on the efficacy of EMDR in reducing the targeted distress (based on SUD score reported by client). After sufficient decrease of distress, the installation phase was carried out (Solomon & Rando, 2012). When clients reported no change in their SUD scores after two consecutive sessions, the EMDR was ended and the number of treatment sessions for each participant were recorded. Each session lasted between 45-60 minutes. The intervention was performed by the second author under the supervision of a qualified EMDR specialist.

Ethical considerations

The present study was reviewed and approved by the Ethics Committee of Qazvin University of Medical Sciences (IR.QUMS.REC. 1401.026 approved 09-05-2022). In addition, the study was registered and approved in the Iranian Registry of Clinical Trials (IRCT20220222054101N1 first registered on 18-06-2022). Written informed consent was acquired from all participants before commencing EMDR.

Data analysis

After collecting the data, they were entered into SPSS software version 26. The distribution of demographic variables between two groups was compared based on Imbens and Rubin's criteria (Imbens & Rubin, 2016). Here, a standardized mean difference (SMD) of less than 0.25 in quantitative variables between two groups and a difference of less than 10% in qualitative variables is considered as a balanced distribution of variables between two groups (Imbens & Rubin, 2016).

At first, the normality of the distribution of the data by the study groups was checked and confirmed by using the Shapiro-Wilks test, checking the central and dispersion indices and the histogram chart. Due to the normality of the data distribution, in order to compare the changes in the mean score of fear of COVID-19 between the study groups at different times, analysis of variance (ANOVA) for repeated measures was used. In each case, the prerequisites for conducting ANOVA for repeated measures, including the test of sphericity and homogeneity of variances, were checked. Due to the default of sphericity, the results were reported with Greenhouse-Geisser correction. Comparisons between groups at different time points were performed with Bonferroni correction. The results of the analysis are presented in the form of tables and graphs.

Mean differences were analyzed to assess the minimal clinically important difference (MCID). The MCID for the outcomes was calculated using the method based on the data distribution (Copay et al., 2007). The MCID for the patient-reported outcomes may vary based on the patients and the clinical context, so it is better to calculate them in each study and based on the data (Sedaghat & Surgery, 2019). Calculation of MCID was based on the distribution-based method recommended by Jacobson and Truax (1992), and was calculated using the following formula:

$$MCID = 1.2 * 1.96 * SD_{base} * \sqrt{2*(1-ICC)}$$

The minimum clinically important difference in the Fear of COVID-19 Scale, taking into account the intra-cluster correlation coefficient in three consecutive measurements, was 0.87 and the base variance was 4.15 equal to 2.54.

In order to check the effect size in the present study, two statistical effect size criteria were used based on the eta square index values (in the ANOVA for repeated measures) and the SMD effect size. An

eta square index of less than 0.01 is interpreted as a worthless effect size, between 0.01 and 0.06 as a weak effect size, between 0.06 and 0.14 as a medium effect size, and values greater than 0.14 as a strong effect size. The effect size of the SMD below 0.2 is interpreted as a weak effect size, between 0.2 and 0.5 as a medium effect, and more than 0.5 as a strong effect size (Yanti et al., 2020). The significance level of all tests was considered $p < 0.05$.

Results

In present study, 141 participants were recruited and all of them completed the study and no-one dropped out (Figure 1). Table 1 shows the distribution of demographic variables based on study groups. The variables of overall work experience and work experience in the COVID-19 department did not have a balanced distribution between the groups. Therefore, they were entered as covariate variables in the covariance analysis models.

The results of the repeated measures analysis of variance-covariance to investigate the effect of the intervention on the mean scores on the FCV-19S by the study groups are shown in Table 2. The controlled model in terms of covariates (including the baseline score of fear of COVID-19, overall work experience, and work experience in the COVID-19 department) showed that the average scores in the EMDR intervention group decreased in the in-person method and in the virtual method in the follow-up periods, but there was a significant change. Over time, no changes in FCV-19S scores were found in the control group. The results of the statistical test in the controlled model indicated that the effect of the group was significant ($p < 0.001$) and the eta square effect size (partial η^2 =0.489) was significant.

The mean difference (MD) and the standardized mean difference (SMD) of the FCV-19S score according to the groups and times of the study are shown in Table 3. Mean differences were examined to assess minimal clinically important differences (MCIDs). The MCID in the FCV-19S in the present study was 2.54. Taking this into consideration, in-person EMDR group compared to virtual EMDR group and control group in both follow-ups led to a higher mean difference than the MCID and led to a clinically significant reduction in the fear of COVID-19. Comparing the virtual EMDR group and the control group, the difference in the averages in the crude model was not statistically significant, and despite the statistical significance in the adjusted model, it did not lead to a clinical difference. Also, the effect size of the intervention considering the standardized mean difference index (SMDI) in the in-person EMDR group compared to the virtual EMDR group and the control group was significant (more than 0.8).

Given that that the data in the SUDS did not have a normal distribution, the non-parametric Wilcoxon test was used to compare the averages before and after the intervention. The results of the Wilcoxon test showed that there was no significant difference between subjective distress in the in-person EMDR group [Median (IQR): 6 (Hosseini et al., 2020; Rajabimajd et al., 2021)] and virtual EMDR group [Median (IQR): 5 (Alimoradi et al., 2022; Amin, 2020)] before the intervention ($p = 0.31$), but after the intervention, the

Table 1. Summary characteristics of participants based on study groups.

		EMDR Group (n = 47) No (%)	Virtual EMDR Group (n = 47) No (%)	Control Group (n = 47) No (%)
Gender	Male	12 (25.5)	13 (27.7)	15 (31.9)
	Female	35 (74.5)	34 (72.3)	32 (68.1)
Marital status	Single	15 (31.9)	13 (27.7)	15 (31.9)
	Married	28 (59.6)	31 (66.0)	27 (57.4)
	Divorced	4 (8.5	3 (6.3)	5 (10.6)
History of COVID-19 infection	No	8 (17.0)	5 (10.6)	11 (23.4)
	Yes	39 (83.0)	42 (89.4)	36 (76.6)
		Mean (SD)	Mean (SD)	Mean (SD)
Age		32.55 (6.30)	32.06 (6.93)	32.43 (6.57)
Working experience (years)		10.15 (7.85)	9.30 (7.07)	8.11 (6.01)
Covid ward working experience (month)		16.08 (9.57)	17.81 (8.44)	20.02 (10.37)

Table 2. Effect of interventions on mean (SD) of FCV-19S scores in study time points based on study groups.

Model	Time point	EMDR Group (n = 47)	Virtual EMDR Group (n = 47)	Control Group (n = 47)	RM ANOVA statistical results			
					Effect	F	*p*	Partial η^2
Crude*	Baseline	15.72 (4.57)	15.34 (5.02)	13.58 (2.87)	Time	177.03	<0.001	0.562
	Follow up 1	9.23 (3.06)	12.49 (4.60)	13.38 (2.98)	Group	6.03	0.003	0.08
	Follow up 2	8.47 (2.36)	11.83 (3.96)	12.89 (3.04)	Time* Group	49.19	<0.001	0.416
Adjusted**	Follow up 1	8.73 (2.52)	12.20 (2.47)	14.18 (2.54)	Time	1.63	0.20	0.012
	Follow up 2	8.02 (2.34)	11.59 (2.30)	13.59 (2.37)	Group	64.60	<0.001	0.489
					Time* Group	0.092	0.91	0.001

*The crude model was analyzed using RM-ANOVA.
**The adjusted models analyzed using RM-ANOVA ANCOVA adjusted for baseline fear of COVID-19 scores, working experience (years), COVID-19 ward working experience (month).

Table 3. Mean difference (MD)[#] and standardized mean difference (SMD) FCV-19S mean scores among study groups.

		EMDR vs. Virtual EMDR			EMDR vs. Control			Virtual EMDR vs. Control		
Model	Time point	MD (95% CI)	SMD (95% CI)	*p*	MD (95% CI)	SMD (95% CI)	*p*	MD (95% CI)	SMD (95% CI)	*p*
Crude*	Baseline	0.38 (−1.75; 2.51)	0.08 (−0.25; −0.41)	0.99	2.15 (0.02; 4.28)	−0.56 (−0.90; −0.22)	0.05	1.77 (−0.36; 3.89)	−0.43 (−0.76; −0.10)	0.14
	Follow up 1	−3.26 (−5.07; −1.44)	0.83 (0.49; 1.18)	<0.001	−4.15 (−5.96; −2.34)	1.37 (1.01; 1.74)	<0.001	−0.89 (−2.71; 0.92)	0.23 (−0.10; 0.56)	0.70
	Follow up 2	−3.36 (−4.96; −1.77)	1.03 (0.68; 1.38)	<0.001	−4.43 (−6.02; −2.83)	1.62 (1.24; 2.01)	<0.001	−1.06 (−2.66; 0.52)	0.3 (−0.03; 0.63)	0.32
Adjusted**	Follow up 1	− 3.48 (−4.72; −2.24)	1.39 (1.02; 1.76)	<0.001	−5.45 (−6.75; −4.16)	2.15 (1.74; 2.57)	<0.001	−1.98 (−3.24; −0.71)	0.79 (0.45; 1.13)	0.001
	Follow up 2	− 3.57 (−4.73; −2.42)	1.54 (1.16; 1.92)	<0.001	−5.57 (−6.77; −4.37)	2.37 (1.94; 2.80)	<0.001	−2 (−3.18; −0.82)	0.86 (0.51; 1.20)	<0.001

*The crude model was analyzed using RM-ANOVA.
**The adjusted models analyzed using RM-ANOVA ANCOVA adjusted for baseline fear of COVID-19 scores, working experience (years), COVID-19 ward working experience (month).
#Bonferroni adjustment applied for multiple comparisons.

subjective distress scale scores in the in-person EMDR group [Median (IQR): 1 (0,4)] were significantly ($p < 0.001$) lower than the virtual EMDR group [Median (IQR): 3 (0,7)]. The number of intervention sessions in the two groups was two in most cases (68.1% of participants in EMDR group and 55.3% in virtual EMDR Group), which was not statistically significant ($p = 0.20$).

The results of analysis of variance-covariance to investigate the effect of in-person EMDR, virtual EMDR, and control on the secondary outcomes of the study are presented in Tables 4 and 5. The results showed that despite the decrease in the mean anxiety and depression scores on the HADS after the intervention compared to before in all three groups, no significant difference was observed in the total score on the anxiety and depression subscales in the three groups after the intervention. Work-related quality of life was another secondary variable in the present study. Although an increase in the average score on the WRQLS-2 was observed over time in all three groups, no significant differences were observed in the total score on the WRQLS-2 in the three groups after the intervention.

Discussion

The present controlled clinical trial was conducted to compare the effect of in-person and virtual eye movement desensitization and reprocessing (EMDR) on fear of COVID-19 fear among nurses. The results showed that in-person EMDR treatment was more effective in reducing the fear of COVID-19 compared to the other groups. Despite slight decrease of FCV-19S scores among the virtual EMDR group vs. control, it was statistically significant after adjusting covariates but not clinically significant. The therapeutic results of the in-person EMDR vs. virtual EMDR were obtained over a short period of time (in many cases just two sessions) and were associated with a significant effect size. The therapeutic effect of EMDR has been investigated in relation to the fear COVID-19 among different populations. Promising effects of EMDR have been reported, but some points should be considered.

First, in present study, both in-person and virtual EMDR decreased the nurses' fear of COVID-19. This is consistent with previous literature regarding the effect of EMDR in reducing fear and subjective distress related to COVID-19 among participants hospitalized for COVID-19 (Brennstuhl et al., 2022), COVID-19 survivors (Dinapoli et al., 2023), nurses caring for COVID-19 patients (Tarquinio et al., 2021) and frontline mental healthcare workers (Farrell et al., 2022).

Table 4. Effect of intervention on mean (SD) of anxiety, depression and work-related QoL in study time points based on study groups.

Variables	Time point	EMDR Group (n = 47)	Virtual EMDR Group (n = 47)	Control Group (n = 47)	Statistical analysis*		
					F	*p*	Partial η^2
Anxiety	Before Intervention	9.98 (2.26)	10.13 (2.11)	9.47 (3.18)			
	one month after Intervention	8.88 (1.90)	9.05 (1.88)	9.03 (1.92)	0.11	0.90	0.002
Depression	Before Intervention	11.32 (3.11)	11.70 (2.84)	11.57 (2.37)			
	one month after Intervention	9.39 (2.09)	9.21 (2.05)	10 (2.11)	1.76	0.18	0.026
Work-related quality of life	Before Intervention	91.04 (23.66)	95.47 (25.07)	93.43 (18.97)			
	one month after Intervention	101.01 (7.62)	98.59 (7.55)	98.81 (7.63)	1.41	0.25	0.021

*ANOVA-ANCOVA considering baseline scores, working experience and COVID-19 ward working experience as covariates.

Second, it was found that in-person EMDR had significantly better therapeutic results than virtual EMDR both statistically and clinically. However, although virtual EMDR slightly decreased FCV scores compared to the control group, and was statistically significant after adjusting covariates, it was not clinically significant. To best of the present authors' knowledge, no previous studies have directly compared in-person EMDR with virtual EMDR. Some studies have applied in-person EMDR (Brennstuhl et al., 2022; Dinapoli et al., 2023) and others have applied virtual EMDR (Farrell et al., 2022; Moench & Billsten, 2021; Tarquinio et al., 2021). It should also be noted that most of the previous studies comprised a single group (i.e., no control group) that simply compared scores before and after treatment (Brennstuhl et al., 2022; Dinapoli et al., 2023; Farrell et al., 2022; Tarquinio et al., 2021) and only a few have used a randomized controlled trial design (like the present study) (Moench & Billsten, 2021).

It should also be noted that that the virtual EMDR used in present study was different compared to the previous studies. In present study, visual bilateral simulation was performed using a computer. Development and application of different means of providing visual and or auditory bilateral stimulation on a computer or mobile health applications have been introduced to facilitate the therapeutic process (Lee & Cuijpers, 2013; Shapiro, 2018). The present study used the movement of a ball on a laptop screen to guide eye movements, while other EMDR-related activities (including history taking, identifying the disturbance target, installation, body scan, re-evaluation, and treatment closure) was guided in the same way as the in-person method. Previously published studies used a synchronous program that offered various visual and acoustic forms of bifocal physical stimulation and included an integrative video platform, giving EMDR therapists complete control within the session. The difference is that these other studies provided all steps via the web-based platform but under the control of the therapist. Therefore, future studies comparing the effect of in-person EMDR with an internet-based or videoconference EMDR (where all treatment stages are provided virtually) should be carried out.

There are some potential barriers using virtual EMDR which should be considered when planning its administration. These barriers include the presence of family members at home which might distract client from the therapeutic relationship with therapist. Another barrier is the problem of trying to build a strong psychotherapeutic relationship online because it is easier to establish in-person (Majeskey, 2024; O'Shea Brown, 2021). Also Mischler et al. (2021) summarized the difficulties experienced by EMDR therapists during virtual sessions such as (i) not being able to detect facial expressions, gestures, and eye movements, (ii) internet connection problems which may disrupt the session, (iii) not being able to adapt the EMDR protocol effectively online, (iv) problems with creating therapeutic empathy, and (v) and the negative effect of clients' environmental factors such as presence of family members and not having a private space. Connectivity issues can only be resolved through network expansion by online service providers, especially in rural areas (Solomon & Rando, 2012). To overcome other barriers, when a therapist decides to use virtual EMDR, they should try to ensure that their clients are in rooms where they will not be disturbed by others living in the house, and try their utmost to establish a good therapeutic relationship so that they can more easily detect non-verbal cues and increase the likelihood of the client completing all the EMDR sessions.

Third, the average number of sessions in present study was two sessions of 45-60 minutes. Different numbers of treatment sessions have been reported in previous studies. In the previous studies, the average number of treatment sessions ranged from four (Brennstuhl et al., 2022) to eight (Dinapoli et al., 2023) for in-person sessions for hospitalized COVID-19 patients (Brennstuhl et al., 2022). Internet-based or videoconference EMDR was provided in one treatment session for healthcare providers of COVID-19 patients in two studies (Farrell et al., 2022; Tarquinio

Table 5. Mean difference (MD)[#] and standardized mean difference (SMD) mean scores of anxiety, depression and work-related QoL among study groups.

		EMDR vs. Virtual EMDR			EMDR vs. Control			Virtual EMDR vs. Control		
variables	Time point	MD (95% CI)	SMD (95% CI)	p	MD (95% CI)	SMD (95% CI)	p	MD (95% CI)	SMD (95% CI)	p
Anxiety	Before Intervention	−0.15 (−1.45; 1.15)	−0.07 (−0.48; 0.34)	1.00	0.51 (−0.78; 1.80)	0.19 (−0.22; 0.59)	1.00	0.66 (−0.63; 1.95)	0.25 (−0.16; 0.65)	0.65
	one month after Intervention	−0.17 (−1.12; 0.79)	−0.09 (−0.49; 0.32)	1.00	−0.16 (−1.13; 0.82)	−0.08 (−0.48; 0.33)	1.00	0.01 (−0.95; 0.97)	0.01 (−0.39; 0.42)	1.00
Depression	Before Intervention	0.26 (−0.85; 1.37)	0.13 (−0.28; 0.53)	1.00	1.26 (0.15; 2.36)	0.54 (0.12; 0.95)	0.02	0.99 (−0.11; 2.10)	0.46 (0.05; 0.87)	0.09
	one month after Intervention	0.18 (−0.86; 1.22)	0.09 (−0.32; 0.49)	1.00	−0.61 (−1.69; 0.47)	−0.29 (−0.70; 0.12)	0.52	−0.79 (−1.84; 0.27)	−0.38 (−0.79; 0.03)	0.22
work-related QoL	Before Intervention	−4.43 (−15.78; 6.93)	−0.18 (−0.59; 0.22)	1.00	−2.38 (−13.74; 8.98)	−0.11 (−0.52; 0.29)	1.00	2.04 (−9.32; 13.40)	0.09 (−0.31; 0.50)	1.00
	one month after Intervention	2.42 (−1.40; 6.24)	0.32 (−0.09; 0.73)	0.38	2.20 (−1.70; 6.11)	0.29 (−0.12; 0.70)	0.52	−0.22 (−4.04; 3.60)	−0.03 (−0.43; 0.38)	1.00

[**]The adjusted models analyzed using RM-ANOVA ANCOVA adjusted for baseline working experience (years), Covid ward working experience (month).
[#]Bonferroni adjustment applied for multiple comparisons.

et al., 2021), or it was provided offline, in five videos in stepwise manner (each step had to be completed to open the next video) (Moench & Billsten, 2021). However, in EMDR therapy, the number of sessions is determined based on the efficacy of EMDR in reducing the targeted distress sufficiently (based on SUD scores reported by client) which might mean that patients need multiple sessions. After sufficient decrease of distress, the installation phase can be carried out (Solomon & Rando, 2012). Therefore, there is no fixed number of treatment sessions. The required number of treatment sessions should be determined based on the change in subjective distress of clients (assessed using the SUDS).

Fourth, work-related quality of life, anxiety and depression were secondary outcomes examined in the present study. Despite decreased level of anxiety and depression and increased level of work-related quality of life in EMDR groups three months after the intervention, there was no significant difference based on study groups. The positive effects of EMDR on anxiety (Brennstuhl et al., 2022; Fotovvat et al., 2021; Tarquinio et al., 2021; Yurtsever et al., 2022; Zolghadr et al., 2019) and depression (Malandrone et al., 2019; Sepehry et al., 2021; Tarquinio et al., 2021) have been reported in previous studies which is not consistent with the findings of the present study. The source of this inconsistency may be due to the selected target of disturbance for EMDR therapy. Before starting the EMDR treatment, the clients' unpleasant and disturbing feelings and the target are identified (Elledge, 2021). Because the primary focus of disturbing feelings in present study was COVID-19-related fear rather than anxiety or depression, these two secondary outcomes in the present study may not have reduced significantly given that reducing the fear of COVID-19 was the primary aim (i.e. the EMDR was focused on reducing fear of COVID-19 not on reducing general anxiety or depression). Work-related quality of life is also a multi-dimensional constructs (Easton & Van Laar, 2018; Van Laar et al., 2007), so it can be affected by various factors (not only fear of working during the COVID-19 pandemic). While decreasing the fear of COVID-19 scores decreased in present study, scores on the work-related QoL scale increased but not significantly.

Limitations

The present study has some limitations that should be considered when interpreting the findings: (i) the assessment of outcomes and all the measures were

based on participants' self-report which is subject to various biases (e.g. memory recall, social desirability), (ii) there was a lack of blinding in the study, (iii) in the virtual EMDR group, the eye movements were guided using the movement of a ball on laptop screen rather than from the therapist, therefore the full EMDR protocol was not provided, and (iv) the participants were a convenience sample of Iranian nurses, therefore the findings may not be generalizable to all Iranian nurses, or to general populations both inside and outside of Iran. Although the results of present study in line with existing literature showing the effectiveness of both in-person and virtual in reducing fear of clients, further evaluation is needed on whether these methods can be used in other settings (inside and outside of Iran) or with other populations that suffer from some forms of fear.

Practical implications

Based on results of present study, providing EMDR using an in-person method appears to be more effective in reducing fear of COVID-19 compared to virtual EMDR. Therefore, where possible, in-person EMDR should be conducted in preference to virtual EMDR. However, there was a reduction in fear of COVID-19 scores observed in virtual EMDR vs. control group. Therefore, in situations where in-person EMDR cannot be conducted (e.g. those who live in geographically distant locations from the therapist, future epidemics or pandemics where there are local or national lockdowns), virtual EMDR could be considered as a potential alternative.

Conclusion

The results of the present study showed that in-person EMDR is a better and more efficient intervention to reduce the fear of COVID-19 than virtual EMDR. Therefore, EMDR appears to be an effective therapeutic intervention to help overcome the fear of COVID-19 and could perhaps be used to reduce other similar fears.

Author contribution

M.S., S.M.M. & M.M. contributed to the conception and design of the study, S.M.M., M.M. & Z.A. contributed to intervention and data collection, S.M.M., M.S. & Z.A. contributed in data analyzing and interpretation of data. S.M.M. & Z.A. drafted the manuscript. Z.A., M.S., M.M. & M.D.G. provided contributions to the literature review and discussion and prepared the final version of the manuscript. M.D.G. revised the manuscript and copy-edited the manuscript. All authors revised the manuscript, agreed to be fully accountable for ensuring the integrity and accuracy of the study, and read and approved the final version of the manuscript to be published. All the authors met the criteria for authorship, and they are listed as co-authors on the title page.

Consent to publication

Not applicable.

Disclosure statement

None to declare.

Ethical approval and consent to participate

The present study was reviewed and approved by the Ethics Committee of Qazvin University of Medical Sciences (IR.QUMS.REC. 1401.026 approved 09-05-2022). In addition, the study was registered and approved in the Iranian Registry of Clinical Trials (IRCT20220222054101N1 first registered on 18-06-2022). Written informed consent was acquired from all participants before commencing EMDR.

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Data availability statement

The datasets analyzed in the study are available from the corresponding author upon reasonable request.

References

Ahorsu, D. K., Lin, C.-Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2022). The Fear of COVID-19 Scale: Development and initial validation. *International Journal of Mental Health and Addiction*, *20*(3), 1537–1545. https://doi.org/10.1007/s11469-020-00270-8

Alimoradi, Z., Ohayon, M. M., Griffiths, M. D., Lin, C.-Y., & Pakpour, A. H. (2022). Fear of COVID-19 and its association with mental health-related factors: systematic review and meta-analysis. *BJPsych Open*, *8*(2), e73. https://doi.org/10.1192/bjo.2022.26

Alizadeh, A., Khankeh, H. R., Barati, M., Ahmadi, Y., Hadian, A., & Azizi, M. (2020). Psychological distress among Iranian health-care providers exposed to coronavirus disease 2019 (COVID-19): a qualitative study. *BMC Psychiatry*, *20*(1), 494. https://doi.org/10.1186/s12888-020-02889-2

Amin, S. (2020). The psychology of coronavirus fear: Are healthcare professionals suffering from corona-phobia? *International Journal of Healthcare Management*, *13*(3), 249–256. https://doi.org/10.1080/20479700.2020.1765119

Ariapooran, S., & Amirimanesh, M. (2020). Depression, anxiety and suicidal ideation of nurses in the outbreak of COVID-19: The role of demographic variables. *Journal of Arak University Medical Sciences*, *23*(5), 724–739. https://doi.org/10.32598/JAMS.23.COV.4093.1

Aziziaram, S., & Basharpoor, S. (2020). The role of health promoting behaviors and health beliefs in predicting of corona anxiety (COVID-19) among nurses. *Quarterly Journal of Nursing Management*, *9*(4), 1–10.

Böhnlein, J., Altegoer, L., Muck, N. K., Roesmann, K., Redlich, R., Dannlowski, U., & Leehr, E. J. (2020). Factors influencing the success of exposure therapy for specific phobia: A systematic review. *Neuroscience and Biobehavioral Reviews*, *108*, 796–820. https://doi.org/10.1016/j.neubiorev.2019.12.009

Brennstuhl, M.-J., Pascale, T., Ann, R. J., Camille Louise, T., Lydia, P., Christine, R., & Cyril, T. (2022). Treating COVID-19 patients with EMDR: A pilot study. *European Journal of Trauma & Dissociation = Revue Europeenne du Trauma et de la Dissociation*, *6*(3), 100276. https://doi.org/10.1016/j.ejtd.2022.100276

Buffel, V., Van de Velde, S., Akvardar, Y., Bask, M., Brault, M.-C., Busse, H., Chatzittofis, A., Ladner, J., Rabiee-Khan, F., Stathopoulou, T., Tavolacci, M.-P., van der Heijde, C., Pischke, C. R., Matos Fialho, P. M., & Wouters, E. (2022). Depressive symptoms in higher education students during the COVID-19 pandemic: The role of containment measures. *European Journal of Public Health*, *32*(3), 481–487. https://doi.org/10.1093/eurpub/ckac026

Chalhoub, Z., Koubeissy, H., Fares, Y., & Abou-Abbas, L. (2022). Fear and death anxiety in the shadow of COVID-19 among the Lebanese population: A cross-sectional study. *PloS One*, *17*(7), e0270567. https://doi.org/10.1371/journal.pone.0270567

Copay, A. G., Subach, B. R., Glassman, S. D., Polly, D. W., Jr., & Schuler, T. C. (2007). Understanding the minimum clinically important difference: A review of concepts and methods. *The Spine Journal: official Journal of the North American Spine Society*, *7*(5), 541–546. https://doi.org/10.1016/j.spinee.2007.01.008

Davis, M., Myers, K. M., Chhatwal, J., & Ressler, K. J. (2006). Pharmacological treatments that facilitate extinction of fear: Relevance to psychotherapy. *NeuroRx: The Journal of the American Society for Experimental NeuroTherapeutics*, *3*(1), 82–96. https://doi.org/10.1016/j.nurx.2005.12.008

de Roos, C., & de Jongh, A. (2008). EMDR treatment of children and adolescents with a choking phobia. *Journal of EMDR Practice and Research*, *2*(3), 201–211. https://doi.org/10.1891/1933-3196.2.3.201

Dinapoli, L., Ferrarese, D., Belella, D., Carnevale, S., Camardese, G., Sani, G., & Chieffo, D. P. R. (2023). Psychological treatment of traumatic memories in COVID-19 survivors. *Clinical Psychology & Psychotherapy*, *30*(1), 225–233. https://doi.org/10.1002/cpp.2771

Dzinamarira, T., Murewanhema, G., Mhango, M., Iradukunda, P. G., Chitungo, I., Mashora, M., Makanda, P., Atwine, J., Chimene, M., Mbunge, E., Mapingure, M. P., Chingombe, I., Musuka, G., Nkambule, S. J., & Ngara, B. (2021). COVID-19 prevalence among healthcare workers. A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, *19*(1), 146. https://doi.org/10.3390/ijerph19010146

Easton, S., & Van Laar, D. (2018). *User manual for the work-related quality of life (WRQoL) scale: a measure of quality of working life: University of Portsmouth.*

Elledge, B. D. (2021). *The Efficacy of online eye movement desensitization and reprocessing (EMDR)-informed therapy for clients with post traumatic stress disorder (PTSD) symptoms*. Dissertations from Texas A&M University-Commerce.

Farrell, D., Fadeeva, A., Zat, Z., Knibbs, L., Miller, P., Barron, I., Matthess, H., Matthess, C., Gazit, N., & Kiernan, M. D. (2022). A Stage 1 pilot cohort exploring the use of EMDR therapy as a videoconference psychotherapy during COVID-19 with frontline mental health workers: A proof of concept study utilising a virtual blind 2 therapist protocol. *Frontiers in Psychology*, *13*, 901855. https://doi.org/10.3389/fpsyg.2022.901855

Farrell, D., Moran, J., Zat, Z., Miller, P. W., Knibbs, L., Papanikolopoulos, P., Prattos, T., McGowan, I., McLaughlin, D., Barron, I., Mattheß, C., & Kiernan, M. D. (2023). Group early intervention eye movement desensitization and reprocessing therapy as a video-conference psychotherapy with frontline/emergency workers in response to the COVID-19 pandemic in the treatment of post-traumatic stress disorder and moral injury: An RCT study. *Frontiers in Psychology*, *14*, 1129912. https://doi.org/10.3389/fpsyg.2023.1129912

Fisher, N. (2021). Using EMDR therapy to treat clients remotely. *Journal of EMDR Practice and Research*, *15*(1), 73–84. https://doi.org/10.1891/EMDR-D-20-00041

Fotovvat, N., Moradi-Baglouee, M., Soleimani, M. A., & Mafi, M. (2021). Effect of eye movement desensitization and reprocessing on death anxiety of gastrointestinal cancer patients in Qazvin hospital in 2018: A randomized clinical trial. *Koomesh Journal*, *23*(2), 183–191. https://doi.org/10.52547/koomesh.23.2.183

Ganjali, R., Jajroudi, M., Kheirdoust, A., Darroudi, A., & Alnattah, A. (2022). Telemedicine solutions for clinical care delivery during COVID-19 pandemic: A scoping review. *Frontiers in Public Health*, *10*, 937207. https://doi.org/10.3389/fpubh.2022.937207

Hassannia, L., Taghizadeh, F., Moosazadeh, M., Zarghami, M., Taghizadeh, H., Dooki, A. F., et al. (2020). Anxiety and depression in health workers and general population during COVID-19 epidemic in Iran: a web-based cross-sectional study. *MedRxiv*.

Heiat, M., Heiat, F., Halaji, M., Ranjbar, R., Tavangar Marvasti, Z., Yaali-Jahromi, E., Azizi, M. M., Morteza Hosseini, S., & Badri, T. (2021). Phobia and Fear of COVID-19: origins, complications and management, a narrative review. *Annali di Igiene: medicina Preventiva e di Comunita*, *33*(4), 360–370. https://doi.org/10.7416/ai.2021.2446

Herrmann, C. (1997). International experiences with the Hospital Anxiety and Depression Scale - A review of validation data and clinical results. *Journal of Psychosomatic Research*, *42*(1), 17–41. https://doi.org/10.1016/s0022-3999(96)00216-4

Hosseini, S., Bahrevar, V., Rahmanian, V., & Hazar, N. (2020). Fear of COVID 19 pandemic: A case study in Iran. *Pakistan Journal of Medical and Health Sciences*, *14*(2), 484–487.

Imbens, G. W., & Rubin, D. B. (2016). *Causal inference for statistics, social, and biomedical sciences: An introduction*. Taylor & Francis.

Ilyas, U., Aslam, F., Fatima, M., Tariq, Z., & Hotiana, U. (2024). Health anxiety, fear of covid-19, nosophobia, and health-protective behaviors among healthcare professionals. *Innovations in Clinical Neuroscience*, *21*(1-3), 31–35.

Jacobson, N. S., & Truax, P. (1992). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. In A. E. Kazdin (Ed.), *Methodological issues & strategies in clinical research* (pp. 631–648). American Psychological Association.

Kayis, A. R., Satici, B., Deniz, M. E., Satici, S. A., & Griffiths, M. D. (2022). Fear of COVID-19, loneliness, smartphone addiction, and mental wellbeing among the Turkish general population: A serial mediation model. *Behaviour & Information Technology*, *41*(11), 2484–2496. https://doi.org/10.1080/0144929X.2021.1933181

Khattak, S. R., Saeed, I., Rehman, S. U., & Fayaz, M. (2021). Impact of fear of COVID-19 pandemic on the mental health of nurses in Pakistan. *Journal of Loss and Trauma*, *26*(5), 421–435. https://doi.org/10.1080/15325024.2020.1814580

Labrague, L. J., & de Los Santos, J. A. A. (2021). Fear of Covid-19, psychological distress, work satisfaction and turnover intention among frontline nurses. *Journal of Nursing Management*, *29*(3), 395–403. https://doi.org/10.1111/jonm.13168

Lee, C. W., & Cuijpers, P. (2013). A meta-analysis of the contribution of eye movements in processing emotional memories. *Journal of Behavior Therapy and Experimental Psychiatry*, *44*(2), 231–239. https://doi.org/10.1016/j.jbtep.2012.11.001

Liou, H., Lane, C., Huang, C., Mookadam, M., Joseph, M., & Hecker DuVal, J. (2022). Eye movement desensitization and reprocessing in a primary care setting: Assessing utility and comparing efficacy of virtual versus in-person methods. *Telemedicine Journal and e-Health: The Official Journal of the American Telemedicine Association*, *28*(9), 1359–1366. https://doi.org/10.1089/tmj.2021.0454

Luo, F., Ghanei Gheshlagh, R., Dalvand, S., Saedmoucheshi, S., & Li, Q. (2021). Systematic review and meta-analysis of fear of COVID-19. *Frontiers in Psychology*, *12*, 661078. https://doi.org/10.3389/fpsyg.2021.661078

Majeskey, A.-M. T. (2024). Clinicians' Perceived barriers to implementing eye movement desensitization and reprocessing therapy. *ProQuest Dissertations & Theses: Walden University*,

Malandrone, F., Carletto, S., Hase, M., Hofmann, A., & Ostacoli, L. (2019). A brief narrative summary of randomized controlled trials investigating EMDR treatment of patients with depression. *Journal of EMDR Practice and Research*, *13*(4), 302–306. https://doi.org/10.1891/1933-3196.13.4.302

Mazloumi, A., Kazemi, Z., Mehrdad, R., Shahri, M. H. K., & Hossein, M. P. (2017). Validity and reliability of WRQoL-2 questionnaire for assessment of nurses' quality of work life. *Journal of Health and Safety at Work*, *7*(2), 6–12.

Mischler, C., Hofmann, A., Behnke, A., Matits, L., Lehnung, M., Varadarajan, S., Rojas, R., Kolassa, I.-T., & Tumani, V. (2021). Therapists' experiences with the effectiveness and feasibility of videoconference-based eye movement desensitization and reprocessing. *Frontiers in Psychology*, *12*, 748712. https://doi.org/10.3389/fpsyg.2021.748712

Moench, J., & Billsten, O. (2021). Randomized controlled trial: Self-care traumatic episode protocol, computerized EMDR treatment of COVID-19-related stress. *Journal of EMDR Practice and Research*, *15*(2), 99–113. https://doi.org/10.1891/EMDR-D-20-00047

Moher, D., Hopewell, S., Schulz, K. F., Montori, V., Gøtzsche, P. C., Devereaux, P. J., Elbourne, D., Egger, M., & Altman, D. G. (2012). CONSORT 2010 explanation and elaboration: updated guidelines for reporting parallel group randomised trials. *International Journal of Surgery (London, England)*, *10*(1), 28–55. https://doi.org/10.1016/j.ijsu.2011.10.001

Montazeri, A., Vahdaninia, M., Ebrahimi, M., & Jarvandi, S. (2003). The Hospital Anxiety and Depression Scale (HADS): translation and validation study of the Iranian version. *Health and Quality of Life Outcomes*, *1*, 14. (https://doi.org/10.1186/1477-7525-1-14

Moradi, M., & Sharififar, S. (2022). Level of fear in front-line nurses during the COVID-19 pandemic, a cross-sectional study in Iran. *Disaster Medicine and Public Health Preparedness*, *17*, e206. https://doi.org/10.1017/dmp.2022.168

Morris, H., Hatzikiriakidis, K., Dwyer, J., Lewis, C., Halfpenny, N., Miller, R., & Skouteris, H. (2023). Early intervention for residential out-of-home care staff using eye movement desensitization and reprocessing (EMDR). *Psychological Trauma: theory, Research, Practice and Policy*, *15*(Suppl 2), S456–S464. https://doi.org/10.1037/tra0001418

Muris, P., Merckelbach, H., Holdrinet, I., & Sijsenaar, M. (1998). Treating phobic children: Effects of EMDR versus exposure. *Journal of Consulting and Clinical Psychology*, *66*(1), 193–198. https://doi.org/10.1037/0022-006x.66.1.193

O'Shea Brown, G. (2021). Reflections on providing virtual eye movement desensitization and reprocessing therapy in the wake of COVID-19: Survival through adaptation. In C. Tosone (Ed.), *Shared trauma, shared resilience during a pandemic: Social work in the time of COVID-19* (pp. 235–248). Springer Nature Switzerland AG. 2021.

Pomeri, A. P., La Salvia, A., Carletto, S., Oliva, F., & Ostacoli, L. (2020). EMDR in cancer patients: a systematic review. *Frontiers in Psychology*, *11*, 590204. https://doi.org/10.3389/fpsyg.2020.590204

Proudlock, S., & Peris, J. (2020). Using EMDR therapy with patients in an acute mental health crisis. *BMC Psychiatry*, *20*(1), 14. https://doi.org/10.1186/s12888-019-2426-7

Rajabimajd, N., Alimoradi, Z., & Griffiths, M. D. (2021). Impact of COVID-19-related fear and anxiety on job attributes: a systematic review. *Asian Journal of Social Health and Behavior*, *4*(2), 51–55. https://doi.org/10.4103/shb.shb_24_21

Ricci, R. J., Clayton, C. A., & Shapiro, F. (2006). Some effects of EMDR on previously abused child molesters: Theoretical reviews and preliminary findings. *Journal of Forensic Psychiatry & Psychology*, *17*(4), 538–562. https://doi.org/10.1080/14789940601070431

Richardson, C. G., Slemon, A., Gadermann, A., McAuliffe, C., Thomson, K., Daly, Z., Salway, T., Currie, L. M., David, A., & Jenkins, E. (2020). Use of asynchronous virtual mental health resources for COVID-19 pandemic–related stress among the general population in Canada: cross-sectional survey study. *Journal of Medical Internet Research*, *22*(12), e24868. https://doi.org/10.2196/24868

Roy-Byrne, P. P., & Cowley, D. S. (2002). Pharmacological treatments for panic disorder, generalized anxiety disorder, specific phobia, and social anxiety disorder. In P. A. Nathan, & J. M. Gorman (Eds.), *A guide to treatments that work* (2nd ed., 337–365).

Saint-Jammes, J. T., Sorel, O., Zara-Jouillat, E., Martin, C.-H., Gil-Jardiné, C., & Lavandier, A. (2022). COVID-19 and healthcare professionals: The psychological impact of the pandemic on healthcare professionals and the use of EMDR early interventions. *Journal of EMDR Practice and Research*, *16*(3), 156–168. https://doi.org/10.1891/EMDR-2022-0006

Sedaghat, A. R., & Surgery, N. (2019). Understanding the minimal clinically important difference (MCID) of patient-reported outcome measures. *Otolaryngology-Head and Neck Surgery: official Journal of American Academy of Otolaryngology-Head and Neck Surgery*, *161*(4), 551–560. https://doi.org/10.1177/0194599819852604

Sepehry, A. A., Lam, K., Sheppard, M., Guirguis-Younger, M., & Maglio, A.-S. (2021). EMDR for depression: A meta-analysis and systematic review. *Journal of EMDR Practice and Research*, *15*(1), 2–17. https://doi.org/10.1891/EMDR-D-20-00038

Shapiro, F. (2001). *Eye movement desensitization and reprocessing (EMDR): Basic principles, protocols, and procedures*. Guilford Press.

Shapiro, F. (2018). *Eye movement desensitization and reprocessing (EMDR) therapy; Basic principals, protocols and procedures* (3rd ed.). The Guilford Press.

Shapiro, F., & Forrest, M. (2001). *EMDR: Eye movement desensitization and reprocessing*. Guilford.

Sheikhi, M. R., Hosseinkhani, Z., Khezri, R. H., Froozanfar, Z., & Khodamoradi, F. (2022). Investigating self-rated health among health workers during COVID-19 pandemic in northwest Iran. *Journal of Inflammatory Diseases*, *26*(2), 59–66. https://doi.org/10.32598/JID.26.2.6

Sheikhi, M., Moradi,M., Shahsavary, S., Alimoradi, Z., & Salimi, H. R. (2020). The effect of eye movement desensitization and reprocessing on the fear of hypoglycemia in type 2 diabetic patients: a randomized clinical trial. *BMC Psychology*, *8*(1), 82. https://doi.org/10.1186/s40359-020-00450-0

Shoja, E., Aghamohammadi, V., Bazyar, H., Moghaddam, H. R., Nasiri, K., Dashti, M., Choupani, A., Garaee, M., Aliasgharzadeh, S., & Asgari, A. (2020). Covid-19 effects on the workload of Iranian healthcare workers. *BMC Public Health*, *20*(1), 1636. https://doi.org/10.1186/s12889-020-09743-w

Solomon, R., & Rando, T. (2012). Treatment of grief and mourning through EMDR: Conceptual considerations and clinical guidelines. *European Review of Applied Psychology*, *62*(4), 231–239. https://doi.org/10.1016/j.erap.2012.09.002

Suryakumari, V., Reddy, Y. P., Yadav, S. S., Doshi, D., & Reddy, V. S. (2022). Assessing fear and anxiety of corona virus among dental practitioners. *Disaster Medicine and Public Health Preparedness*, *16*(2), 555–560. https://doi.org/10.1017/dmp.2020.350

Szczurek, K., Furgał, N., Szczepanek, D., Zaman, R., Krysta, K., & Krzystanek, M. (2021). Medical student syndrome. a myth or a real disease entity? Cross-sectional study of medical students of the medical university of Silesia in Katowice, Poland. *International Journal of Environmental Research and Public Health*, *18*(18), 9884. https://doi.org/10.3390/ijerph18189884

Tarquinio, C., Brennstuhl, M.-J., Rydberg, J. A., Bassan, F., Peter, L., Tarquinio, C. L., Auxéméry, Y., Rotonda, C., & Tarquinio, P. (2021). EMDR in telemental health counseling for healthcare workers caring for COVID-19 patients: A pilot study. *Issues in Mental Health Nursing*, *42*(1), 3–14. https://doi.org/10.1080/01612840.2020.1818014

Triscari, M. T., Faraci, P., D'Angelo, V., Urso, V., Catalisano, D. J. A. P., & Factors, A. H. (2011). Two treatments for fear of flying compared: Cognitive behavioral therapy combined with systematic desensitization or eye movement desensitization and reprocessing (EMDR). *Aviation Psychology and Applied Human Factors*, *1*(1), 9–14. https://doi.org/10.1027/2192-0923/a00003

Ünver, S., & Yeniğün, S. C. (2021). COVID-19 fear level of surgical nurses working in pandemic and surgical units. *Journal of Perianesthesia Nursing: Official Journal of the American Society of PeriAnesthesia Nurses*, *36*(6), 711–716. https://doi.org/10.1016/j.jopan.2021.04.014

Van Laar, D., Edwards, J. A., & Easton, S. (2007). The Work-Related Quality of Life Scale for healthcare workers. *Journal of Advanced Nursing*, *60*(3), 325–333. https://doi.org/10.1111/j.1365-2648.2007.04409.x

Witteveen, A. B., Young, S., Cuijpers, P., Ayuso-Mateos, J. L., Barbui, C., Bertolini, F., Cabello, M., Cadorin, C., Downes, N., Franzoi, D., Gasior, M., John, A., Melchior, M., McDaid, D., Palantza, C., Purgato, M., Van der Waerden, J., Wang, S., & Sijbrandij, M. (2022). Remote mental health care interventions during the COVID-19 pandemic: An um-

brella review. *Behaviour Research and Therapy*, *159*, 104226. https://doi.org/10.1016/j.brat.2022.104226

Wolitzky-Taylor, K. B., Horowitz, J. D., Powers, M. B., & Telch, M. J. (2008). Psychological approaches in the treatment of specific phobias: A meta-analysis. *Clinical Psychology Review*, *28*(6), 1021–1037. https://doi.org/10.1016/j.cpr.2008.02.007

Wolpe, J. (1990). *The practice of behavior therapy*. Pergamon press.

World Health Organization. (2021). *Second round of the national pulse survey on continuity of essential health services during the COVID-19 pandemic: January-March 2021: interim report, 22 April 2021*.

Yanti, I., Suryani, L., & Kinanti, R. R. (2020). Interest of midwives in providing midwifery services through teleconsultation in the pandemic time of Covid-19. *PalArch's Journal of Archaeology of Egypt/Egyptology*, *17*(9), 7619–7627.

Yurtsever, A., Bakalim, O., Karaman, Ş., Kaya, S., & Konuk, E. (2022). The effect of the online eye movement desensitization and reprocessing early intervention protocol (EMDR R-TEP) for the risk groups with post-traumatic stress symptoms during the COVID-19 pandemic. *Frontiers in Psychology*, *13*, 935782. https://doi.org/10.3389/fpsyg.2022.935782

Zandifar, A., & Badrfam, R. (2020). Iranian mental health during the COVID-19 epidemic. *Asian Journal of Psychiatry*, *51*, 101990. https://doi.org/10.1016/j.ajp.2020.101990

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, *67*(6), 361–370. https://doi.org/10.1111/j.1600-0447.1983.tb09716.x

Zolghadr, N., Khoshnazar, A., MoradiBaglooei, M., & Alimoradi, Z. (2019). The effect of EMDR on childbirth anxiety of women with previous stillbirth. *Journal of EMDR Practice and Research*, *13*(1), 10–19. https://doi.org/10.1891/1933-3196.13.1.10