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A PILOT STUDY OF THERAPEUTIC BENEFITS FROM EYE MOVEMENT DESENSITIZATION AND REPROCESSING PSYCHOTHERAPY IN MAJOR DEPRESSIVE DISORDER ASSOCIATED WITH POST-TRAUMATIC STRESS DISORDER

Clinical Research

Soontaree Srikosai* Rajanagarindra Institute of Child Development. *Corresponding Author

Chadaporn Khamfou Rajanagarindra Institute of Child Development.

Anongporn Thakham Rajanagarindra Institute of Child Development.

Jeerawan Wongmueang Rajanagarindra Institute of Child Development.

Kantima Thippunya Rajanagarindra Institute of Child Development.

Uraiwan Wongpothi Rajanagarindra Institute of Child Development.

Praew Tailangkha Rajanagarindra Institute of Child Development.

ABSTRACT

Objective: To investigate the therapeutic benefits of EMDR psychotherapy in treating MDD associated with PTSD. **Methods:** A pilot study was performed by using standardized EMDR psychotherapy in subjects with MDD associated with PTSD. The inclusion criteria were the followings; (1) Adults aged 18 years old or older, (2) Subjects being treated with antidepressants for at least two months assumably stable blood levels, (3) Subjects with depressive symptoms based upon the Patient Health Questionnaire (PHQ-9) depressive scale, (4) Subjects with positive score for traumatic events based upon the Children's Revised Impact of Events Scale-13 (CERIES-13, Thai version). The subjects were eligible if they fulfilled all four criterias. The subjects were treated with 60-90 minutes of EMDR psychotherapy twice a week for three weeks. The changes in PHQ-9 depressive scale, CERIES-13 scale, and Rosenberg self-esteem scale were obtained before the treatment, at the end of the treatment, and 3 months after treatment. The collective data was analyzed with a Paired t-test. **Results:** Eighteen subjects with a mean age of 28 years were enrolled in the study. The subjects had significantly decreased PHQ-9 scale and CERIES-13 scale (mean difference [MD] = -11.47, $p<0.001$; MD = - 36.47, $p<0.001$, respectively), and had significantly increased self-esteem scale (MD = 9.13, $p<0.001$) at 3 months after treatment when compared to prior results. **Conclusion:** The study demonstrated the therapeutic benefits of adding EMDR psychotherapy in MDD associated with PTSD patients who were currently treated with antidepressants. The benefits of adding EMDR psychotherapy may possibly reduce depressive symptoms, PTSD symptoms and improve self-esteem in subjects. Further evaluation of the effectiveness of EMDR psychotherapy is in a guaranteed randomized controlled trial method.

KEYWORDS

MDD, EMDR, PTSD, pilot study, therapy

Background

Major depressive disorder (MDD) is a common disorder and a serious mental health problem which has big impact on health, leads to risky behaviors, relationship problems and higher risk of committed suicides, 30 times higher than those without depression.[1-3] The serious consequences of MDD are disabilities, death from suicide, suffering family members from stress, anxiety, and long-lasting socioeconomic burdens.[4] Furthermore, most of those living with MDD will be psychologically traumatized or diagnosed as having post-traumatic stress disorders (PTSD) later on in life.[5]

MDD may occur once a person has suffered from a form of psychological trauma.[6] Academic evidence indicates that pre-existing depression can influence a person at risk of PTSD after suffering from a psychological-traumatic experience.[6-7] On the other hand, PTSD symptoms may increase the risk of MDD[6,8-9] which in a previous study revealed that PTSD and MDD are associated at high levels (r = 0.84).[10] People experienced substantial stressful life events, loss of their key persons, or psychological trauma in childhood or current life can be contributing factors of MDD.[11]

MDD and PTSD symptoms can affect brain development and neuronal network function that some of the brain's neuronal networks (information processing systems) are unable to resolve as a normal. Therefore, negative memories and negative feelings may be ongoing and have chronic disturbances on a person's psychological aspect.[12] Besides, it can be found that narrow cognitive process, impaired memory, attention and problem-solving skills occurred which are the main problems of psychological trauma and increase the risks of psychological factors affecting other medical conditions.[13]

Treatment of patients with MDD with antidepressants is an important clinical practice. The most common side effect of antidepressants is body weight gain.[14] The meta-analysis done by Fournier et al.[15] found that antidepressants were slightly effective on clinical symptoms of patients than placebo, and the use of antidepressants increased when the symptoms of depression became more severe. Treatment of patients with MDD, therefore, should include both psychotherapy and medication, which have been proven to be more effective than using medication alone.[16]

At present, there is a psychotherapy for MDD patients, PTSD patients, people with psychological trauma, and people experienced adverse life events during childhood, adolescence and adulthood using the eye movement desensitization and reprocessing (EMDR) method. EMDR therapy was initially developed in 1987 by an American psychologist; Francine Shapiro.[17-20] The purpose of EMDR therapy is to reduce emotional distress, enhance adaptive cognitions under three beliefs: (1) having memories of events that disrupt emotions, thoughts and behaviors, (2) present situations stimulate these memories, and (3) having and developing necessary-skills that will help prepare individuals for future events. The mechanism of EMDR therapy is described by the theory of "Adaptive Information Processing Model (AIP Model)" that focuses on the patient's resources with three principles: (1) the human brain can usually process stressful information to complete integration, (2) Only if the information processing system initiation is impaired, memories will be stored in a raw, unprocessed, and maladaptive form. A particularly distressing incident may then become stored in state-specific form. This implies also the inability to connect with other memory networks that hold adaptive information. This disturbance remains stuck because some

neuronal networks blocking the brain's unwinding processes from processing information, and (3) the instruments could be used to stimulate the stuck neuronal network using bilateral stimulation or tapping to achieve the movement of the attached neuronal network in negative memories to start a stronger network in order to reduce the concentration of other neuronal networks and to help dissolve the neuronal networks one by one, resulting in the fusion of new neuronal networks that are more positive in memory information, able to adjust more in positive directions, and appropriate to the present which will change the picture memories, thus be able to resolve emotions, feelings, thoughts and physical reactions[19-20]

Several previous studies show the effectiveness of EMDR therapy for people with depression and the outcomes of EMDR treatment usually include symptoms of depression and symptoms of PTSD.[21–26] However, the study of EMDR psychotherapy in MDD patients with PTSD in the Thai context is limited. Therefore, we are interested in applying EMDR standard program as a co-treatment of pharmacotherapy for MDD patients with PTSD, which is a pilot study to test the benefits of EMDR psychotherapy in MDD patients with PTSD, and expected results from this study will benefit appropriate treatment options for MDD patients with PTSD and serve as a preliminary study to the next full trial study.

Objectives

To assess the effects of six-session-EMDR program in reducing depressive symptoms and symptoms of events' impact, and enhancing a perception of self-esteem among Thai adults who are diagnosed by psychiatrist (based on DSM-5 criteria) as having a major depressive disorder (MDD), and meet the criteria of post-traumatic stress disorder (PTSD).

Research hypothesis

1) MDD clients with PTSD show lower level of depressive symptoms at the 3-month-follow up compared with baseline assessment.
2) MDD clients with PTSD show lower level of events' impact symptoms at the
3-month-follow up compared with baseline assessment.
3) MDD clients with PTSD show higher level of self-esteem at the 3-month-follow up compared with baseline assessment.

Methodology

A pilot study with single group, pretest and post-test research design. The participants were MDD clients with PTSD receiving out patient department services at the Rajanagarindra Institute of Child Development (RICD) from July to October 2020.

Voluntary participants were selected from inclusion criteria as followed:

1) Aged 18 or older.
2) Major diagnosis is major depressive disorder (MDD).
3) Being suffered from psychological trauma as single or multiple events with the score of Revised Child Impact of Events Scale-Thai Version [CRIES-13]) is 25 or more.
4) The scores of Patients Health Questionnaires (PHQ-9) is 9 or more.
5) A psychiatrist or child and adolescent psychiatrist considers EMDR Therapy following these criteria; major diagnosis is MDD, the pharmacological treatment has been stable for at least 2 months, having a history of post-traumatic stress disorder, and have no suicidal ideas.

Exclusion criteria

1) Experiencing substance abuse (except cigarettes or alcohol) within 3 months before participating.
2) Having a state of psychotic symptoms such as hallucinations or delusions.
3) Having suicidal ideas or suicidal behaviors.
4) Receiving other psychological therapy by a specialist.
5) Being pregnant.

Discontinuation criteria

Uncontrollable mental symptoms, difficulty in concentration or communication, relapsing substance use.

Research site

Family intervention clinic at Rajanagarindra Institute of Child Development, Chiang Mai, Thailand.

Therapeutic intervention

An individual program consists of 6 sessions. All participants participated twice a week, 60-90 minute-sessions of EMDR therapy for MDD patients with PTSD which is based on the EMDR standard procedure methodology, delivered by psychiatric nurses and clinical psychologists who are well trained in the EMDR therapy and received a certificate of EMDR therapy including an introduction phase, level I phase, level II phase, and EMDR therapy for child and adolescent. Six sessions completed within three weeks in each case.

The content of EMDR therapy program for MDD patients with PTSD described as:

Session 1: History taking, case conceptualization, providing psychoeducation, and treatment planning

Session 2: Preparation – learning of relaxation or grounding techniques at least 5 techniques including deep breathing, flaming, container, butterfly hug, point of power, light stream, and inner safe place imagery.

Session 3: Treatment with five steps; imagine an inner safe place and container technique before starting the 5 steps.

1) Assessment – (1.1) identify target memory, (1.2) identify vivid visual image related to the target memory, (1.3) identify negative cognition about themselves (NC), (1.4) identify positive cognition about themselves (PC) and validity of cognition scale (VOC), (1.5) identify related emotion, (1.6) identify bodily sensation, and (1.7) validity of subjective units of disturbance scale (SUDS).

2) Desensitization – the participant will be asked to focus on the vivid visual image related to the target memory, their NC, feelings, and body sensations while they following the back and forth movement of the therapist's fingers. Sets continue until the reported distress (SUD) is decreased to 0 or 1, and the VOC reaches 7.

3) Installation of PC – to increase the strength of PC which is supposed to let the client simultaneously thinks about the original memory and the most enhancing positive cognition while experiencing dual-attention stimulation by the bilateral stimulation.

4) Body scan – get the body scanned to know whether any somatic response considered as residues of tension related to the targeted image is still remaining. If it presents, the therapist will target this body sensation for further processing. If not, participant will be asked to focus on target image, PC, and body relaxation while using slow bilateral stimulation.

5) Closure – using the grounding techniques when reprocessing has not completed. The therapist explains what to expect between sessions and make a record of disturbances that arise between sessions to use these targets, if necessary, in further sessions.

Session 4: Re-evaluation of the SUD and PC in session 3, and treatment with 5 steps follow session 3.

Session 5: Re-evaluation of the SUD and PC in session 4, and treatment with 5 steps
follow session 3.

Session 6: Re-evaluation of the SUD and PC in session 5, and summarize and terminate.

Note: Therapy were video recorded for at least two sessions in session 3, 4, or 5 in order to monitor the quality of therapy by the EMDR lecturer from EMDR association of Thailand.

Assessment Tools

1) Revised Child Impact of Events Scale-Thai Version [CRIES-13]), is a 13 item-self report questionnaires. Answers to items on the scale are based on 4 points from none = 0, rarely = 1, sometimes = 3, and a lot = 5. The cut off score is ≥ 25 on the CRIES-13 which means the PTSD criteria are met.[27]

2) Patient Health Questionnaire-9 Thai Version (PHQ-9), is 9 item-self report questionnaires. Answers to items on the scale are based on 4 points from none = 0, sometimes/not often = 1, often = 2, and almost

every day = 3. The cut off score is ≥ 9 on the PHQ-9 which means the MDD criteria are met.[28] The severity of depression graded by the score are as followed:

9-14 = mild depression
15-19 = moderate depression
≥20 = severe depression

3) Rosenberg Self-Esteem Scale Thai Version (SES), is 10 item-self report questionnaires.

Answers to items on the scale are based on 4 points from strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1.[29]

≥3.5	=	highest self-esteem
2.5 – 3.49	=	high self-esteem
1.5 – 2.49	=	moderate self-esteem
<1.5	=	less self-esteem

The quality testing of CRIES-13, PHQ-9, and SES using internal consistency reliability technique among 12 MDD patients who were similar to the participants in the research. Cronbach's alpha revealed 0.879, 0.876, and 0.872, respectively.

4) Demographic questionnaires assessing gender, age, education, marital status, race, occupation, and number of family members.

Qualifications of a psychotherapist

The therapists who undertook the EMDR psychotherapy program are the followings:

1 psychiatric nurse and 1 psychologist with qualifications to provide psychotherapy using the EMDR standard protocol organized by the EMDR Association of Thailand through the supervision of a qualified supervisor of the EMDR Association of Thailand. Both of which obtained certificate of the EMDR psychotherapy training course including an introduction course (basic), level I, level II, and EMDR for child and adolescent course. They also attended a supervised course by the lecturer of the EMDR Association of Thailand in order to prepare knowledge and skills before conducting the research. Moreover, they have been providing EMDR psychotherapy in their routine work for more than two years.

Data collection

The study was conducted after obtaining permission from the Department of Mental Health's Ethics Committee (Ethics number: DMH.IRB.COA 026/2563) and registering it in Thai Clinical Trails Registry (TCTR number: TCTR20191008004).

Data was collected from (1) volunteers participated in the research were evaluated the eligibility using the inclusion criteria, (2) researchers invited volunteers to participate in the research in accordance with the informed consent process in voluntary participation. (3) non-research psychiatric nurses collected data prior to psychotherapy under this EMDR psychotherapy program (baseline assessment), (4) subjects participated this EMDR psychotherapy program twice a week and completed at the third week, and (5) the same psychiatric nurses in item 3 performed data collection at three month-follow up.

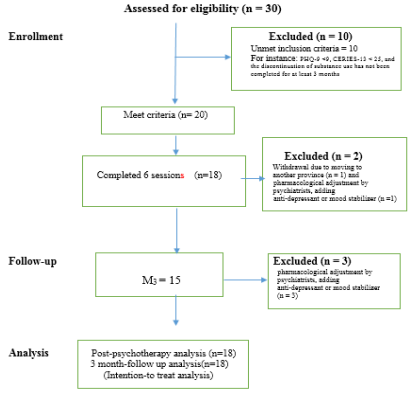

Figure1: The Consolidated Standards of Reporting Trials (CONSORT)

Data analysis

1) Descriptive statistics were used to analyze participants' demographic data such as frequency, percentage, mean, and standard deviation.
2) Paired t-test was used to compare the mean scores of PHQ-9, CRIES-13, and self-esteem between the base line and three month-follow up.

Results

The study conducted a total of 18 subjects; Primarily female (83%), mean age 28 years, educational background of a bachelor degree or higher (61.1%), single marital status (77.8%), Thai ethnicity (94.4%), Thai nationality (94.4%), full time employee (44.4%), students (27.8%), no history of brain accidents (94.4%), and no history of substance abuse (83.3%) (Table 1).

The medication given to the subjects are antidepressant combined with benzodiazepine group and/or low dose antipsychotic drugs, only 1 subject received purely antidepressant. (Table not presented). There were 12 subjects with severe depression, 4 subjects with moderate depression, 2 subjects with mild depression and 16 subjects with 2 or more events of severe psychological trauma. (Table not presented).

Depression symptoms

Symptoms of depression after completing the EMDR psychotherapy program showed a declining pattern, comparing the PHQ-9 score between pre-program and at the 3 month-follow up. (Table 2).

Symptoms of PTSD

Symptoms of PTSD or effects caused from traumatic incidents showed a declining pattern after completing the EMDR psychotherapy program, with a difference in CRIES-13 score between pre-program and at the 3 month-follow up (Table 3). There were 3 factors that were not statistically different between pre-program and at the 3 month-follow up as follows. One, factor 2 (trying to forget the event), factor 6 (trying to avoid reminiscent of events), and factor 10 (trying not to think about the event). (Table not presented).

Perception of self-worth

Self-esteem scores after completing the EMDR psychotherapy program showed an increasing pattern, comparing Rosenberg self-esteem score between pre-program and at the 3 month-follow up. (Chart 2).

Discussion

The depressive symptoms of MDD patients with PTSD after receiving the EMDR psychotherapy program were significantly lower at post-test and 3 month-follow up compared to before receiving the program (Table 2). According to the research hypothesis, it is shown that pharmacological therapy combined with EMDR psychotherapy is effective on depressive symptoms at short-term follow up similar to previous studies [11, 30–35] which can be described by the principle of the Adaptive Information Processing (AIP) Model, where depression is the result of the non-occurrence of normal brain processes. The activation of the stranded neuronal network using bilateral stimulation causes the translocation of the attached neuronal network in negative memories, beginning of the stronger network to have an effect on reducing the concentration of other neuronal networks and to help unwinding the neuronal network of memories of stressful events at the same time. This results in the fusion of new neuronal networks, which have more positive memory information, through the process of desensitization. There have been more positive and appropriate adjustments to current situations, change of the memories leading to the relief of emotions, feelings, thoughts and physical reactions. Therefore, it results in the reduction of depressive symptoms.[18-21,36]

In this study, 3 subjects had to withdraw from the program after 3 months of participation due to the continuation of severe depression alongside with self-harm thoughts leading to the adjustment of medication by a psychiatrist.

The symptoms of event-effects of MDD with PTSD patients after completing the EMDR psychotherapy program were significantly lower at 3 month-follow up compared to before receiving the EMDR psychotherapy program. (Table 2) as expected in the research hypothesis. To which shows that combining pharmacological therapy with EMDR psychotherapy can be proven to be effective in reducing the symptoms of event-effects at short-term follow up. Results from

this study are similar to previous studies [33-34, 37-41], this can be explained by the principles of the AIP Model above, and past traumatic experiences that continue to interfere with current life in PTSD subjects who have retained 'memory network' . Traumatic experiences and/or negative experiences are so strong that make the brain cannot link to other neural networks, despite the fact that the other neural networks has the ability to naturally adapt to deal with problems.[17] In addition, the 'memory network' of these traumas is continuously stimulated by various internal and external stimuli generating inappropriate responses[42].

The standard 8 phase-EMDR psychotherapy program includes standardized 8 phases[43-44]: (1) client history taking and treatment plan (case conceptualization), (2) preparation, (3) assessment, (4) desensitization, (5) installation, (6) body scan, (7) closure, and (8) re-evaluation. These 8 phases will allow traumatic memory networks to bind to the adaptive network through the process of desensitization through bilateral stimulation. This allows traumatic memories to connect with adaptive resolutions and problem solving and also shows an increase in positive change of perceptions, feelings, and emotions.[17-20, 42] This is due to the fusion of the neuronal networks in negative memories to the new neuronal networks that have more positive memory information, capability to adjust and solve problems leading to more positive directions and more suitable for current situation. This has the effects on image changing of the memory and leads to the relief of emotions, feelings, thoughts and body reactions.[19-20] Self-esteem in MDD with PTSD patients after completing the EMDR psychotherapy program showed a significantly higher score at the post-test and at 1 month-follow up in comparison to before receiving the program (Figure 2) which follows the research hypothesis. It has been shown that the EMDR psychotherapy program has a beneficial effect on increasing self-esteem at short-term follow up. Similar to previous studies[45-46], we are able to explain the 'contribution of information processing' process in EMDR psychotherapy. This is done through stimulation of the movement of the eyeballs (bilateral stimulation) to help with the obstruction of the 'visuospatial sketchpad' that interferes with memories leading to stimulation of responses in new directions. Interference of memories and stimulation of new responses are done through creating new associations that are associated with abnormally stored data or information in the brain. The new responses create new sets of physiologically relaxed responses which activate neurological processes that mimic the activity of the 'REM sleep-type' and information processing mechanisms of the brain[46]. When abnormally stored memories due to stressful events are triggered, new fusion links to the positive information stored in the brain occur.

Thus, it is possible to result in more positive feelings about one's self in new directions which corresponds to the VOC level with the score of 7/7 after treatment. (Table not presented).

However, there were five unchanged areas of the Self-Esteem Score: Number 1 (I generally feel satisfied with myself); Number 2 (Sometimes I think I'm not good at all); Number 3 (I feel like I have a lot of good points); Number 6 (Sometimes I feel like I am useless; Number 8 (I wish I had more self-esteem). These factors involve being unsure of the patients' self until there is a clear outcome. Each participant in the sample group has different basic personality traits and/or have different self-esteem-related achievement goals

Conclusion:

The study demonstrated the therapeutic benefit of adding EMDR psychotherapy in pharmacologically treated MDD with PTSD patients. Adding EMDR psychotherapy possibly reduces the depressive and PTSD symptoms and improves patients' self-esteem. Further evaluation of the effectiveness of EMDR psychotherapy in a randomized controlled trial method is warranted.

Limitation

As it is a pilot study, the results of this study may not be able toextend to general populations with MDD and PTSD, and the number of participants was reduced from 18 to 15 at 3 month-follow up, still within 83% of participants.

However, this study provides preliminary academic evidence on the benefits of EMDR psychotherapy program for MDD with PTSD patients in terms of suitability and confidence in the core components of the EMDR psychotherapy program according to the volunteer recruitment process, the criteria for selecting volunteers to participate in the study, the discontinuation criteria, and the duration of therapy in each session in the program.

Acknowledge

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Table 1: Demographic data of MDD with PTSD patients (n = 18)

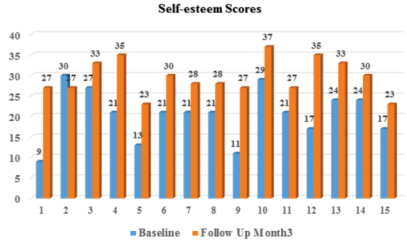
Demographic data	Frequency (Percent)	
Gender	Male Female	3)16.7(15)83.3(
Age		28 ± 7.7 (min = 18, max = 44)
Education	High school Bachelor degree	8 (44.5) 10 (55.5)
Marital status	Single Married Widow	14 (77.8) 3 (16.7) 1 (5.5)
Race	Thai Burmese	17)94.4(1)5.6(
Occupation	Student Official Trade Staff	5)27.8(2)11.1(2)11.1(9 (50.0)
History of head injuries	No Yes	17 (94.4) 1 (5.6)
History of substance abuse	No Yes	15 (83.3) 3 (16.7)

Table 2: A comparison of PHQ-9 scores between baseline and 3 month-follow up (n = 18)

Variable	Baseline Mean (SD)	3 month-F/U Mean (SD)	Paired Differences				
			Mean difference (M3 – Baseline)	95% Confidence interval of the difference		t	p-value
PHQ-9	18.67)5.54(	7.20)5.92(	-11.47 (9.58)	Lower 6.16	Upper 16.77	4.63 4 df = 14	<0.001

Table 3: A comparison of CRIES-13 scores between baseline and 3 month-follow up (n = 18)

Variable	Baseline Mean (SD)	3 month-F/U Mean (SD)	Paired Differences				
			Mean difference (M3 – Baseline)	95% Confidence interval of the difference		t	p-value
CRIES-13	45)11.24(	8.53)7.72(	-36.47 (11.23)	Lower 30.25	Upper 42.69	12.5 76 df = 14	<0.001



Mean difference)M3 – Baseline) = 9.13 (S.D. = 5.51), t = -6.415, df = 14, p-value <0.001

Figure 2: A comparison of self-esteem scores between baseline and 3 month-follow up (n = 18)

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