The effectiveness of eye movement desensitization and reprocessing (EMDR) in reducing pathological worry in patients with generalized anxiety disorder: a preliminary study

Rezvani Farima, Shiva Dowlatabadi, Safieh Behzadi

Summary

Aims. The current study aimed to investigate the effectiveness of eye movement desensitization and reprocessing (EMDR) in reducing pathological worry in patients with generalized anxiety disorder (GAD).
Method. Three women with GAD were selected using a purposeful sampling method based on the Structured Clinical Interview for DSM-IV Axis I disorders (SCID-I). A baseline single-case experimental design was used and participants were included in the treatment in a stepped manner. The Generalized Anxiety Disorder Questionnaire (GADQ-IV), the Pennsylvania State Worry Questionnaire (PSWQ), the Worry Domain Questionnaire (WDQ), the Intolerance of Uncertainty Scale (IUS) and the Cognitive Avoidance Questionnaire (CAQ) were used as the baseline, pre-treatment, post-treatment and one-month follow-up assessments.
Results. The results showed that EMDR is effective in reducing pathological worry in patients with GAD. The participants were also successful in reducing the extent of their areas of worry, increasing their tolerance to uncertainty and conquering their cognitive avoidance. One-month follow-up also showed that the decline trend of participants' worries continued. During EMDR, participants' negative images, emotions and cognition were decreased and gradually lost their reliability, whereas positive aspects became alive and active.
Conclusions. EMDR is an effective method for the treatment of GAD in women.

eye movement desensitization and reprocessing / pathological worry / generalized anxiety disorder

INTRODUCTION

Generalized anxiety disorder (GAD) is a common psychiatric disorder [1]. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), the 12-month prevalence for GAD across the world ranges from 0.4 to 3.6%. Females are twice as likely as males to experience GAD [2]. With its high prevalence, GAD accounts for over 30% of treatments [3] and the

Farima Rezvani[1]; Shiva Dowlatabadi[2]; Safieh Behzadi[1]: [1]Department of Psychology, Roudehen Branch, Islamic Azad University, Roudehen, Iran; [2]Department of Psychology, Allameh Tabataba'i University, Tehran, Iran. **Correspence email**: sh_dolatabadi@yahoo.com

World Health Organization (WHO) concluded that 8% of those seeking treatment meet the GAD diagnostic criteria [4]. Epidemiology studies in Iran also show that among anxiety disorders, GAD is more common [5].

Uncontrollable excessive worry occurring more days than not for at least 6 months following several physical and mental symptoms are considered the main diagnostic criteria for GAD in DSM-5 [2]. Without serious and active intervention, GAD prognosis is less favourable Studies that sought the distinction between worry and anxiety have shown that in most cases, worry leads to anxiety, rather than anxiety causing worry [6]. Worry is the key component to trait anxiety or neuroticism, and it can be considered as the cognitive component of anxiety [7].

Various methods have been proposed for the control and treatment of GAD-induced worry. With an emphasis on pathological fundamentals such as biochemical changes or psychotherapy, these therapies have proposed several frameworks which people with worries rely on to challenge their own condition. In recent years, eye movement desensitization and reprocessing (EMDR) short-term psychotherapy was one of the methods effective in the treatment or reduction of pathological worry in GAD [8]. It was first introduced by Francis Shapiro to treat posttraumatic stress disorder (PTSD) [9, 10]. A meta-analytic study showed that trauma-focused cognitive-behavioural therapy (CBT) and EMDR tend to be equally efficacious for treating PTSD in adults [11].

EMDR is a complex and integrated treatment method developed through combining many aspects of different approaches to psychology, including behavioural, cognitive and psychoanalytical approaches. It is a kind of exposure therapy for patients who have experienced traumatic stress [12].

It is said that anxiety disorders are caused in association with thoughts, cognitions [13] and bodily feelings [14]. EMDR is effective in modifying negative thoughts, replacing them with positive thoughts and adjusting the physical changes through desensitization, i.e. it is a multi-dimensional treatment [15]. Effective processing in EMDR is based on efficient targeting; if wrong targets or incorrect components are selected, the treatment will not be associated with desired results. Targets are the main cornerstone of EMDR; that is why they need special attention. When a target is agreed by the patient and therapist and its boundaries are defined, both have the chance to understand the extent of injury and thereby to achieve faster processing. After selecting the target, the most useful dimensions for therapy include illustration, positive and negative cognitions, emotions, the rate of disruption, and physical feelings associated with all negative memories.

The main characteristic of EMDR is the eye movement desensitization which includes fundamental sensory stimulations and frequent revealing of visual, tactile and auditory activities in the left and right hemispheres. This clinical technique is performed repeatedly through visual bilateral stimulation using the therapist's finger movements to the left and right, horizontally on a line about 50 cm distance from the patient. This action leads to the patient's eye tracking [16]. EMDR approach is based on Shapiro's Adaptive Information Processing (AIP) model. Its eight steps are taking the patient's medical history, preparation, assessment, desensitization, installation, body scan, closure and re-evaluation [10, 17]. In this approach, three periods of time are considered in the treatment: past experiences which have provided the background to damage, current situations or drivers that activate the disorder, and required background for appropriate behaviours in the future [10].

According to the aetiological model of GAD, experiential factors play an influential role in the development of this disorder. Excessive worry as the main symptom of GAD prevents the processing of emotional distress, which is the stimulus and precipitating factor of pathological worry. It seems logical to accept that there is a parallel relationship between aetiological model of GAD and Shapiro's AIP model assuming that unprocessed life experiences influence the development of personality and mental disorders [8].

Reviewing the literature clearly indicated that EMDR is effective in various anxiety disorders, including PTSD [18-20], social anxiety [21-24], specific phobia [25] and reducing symptoms of anxiety in other anxiety disorders [26-29]. However, few studies have been conducted on the effectiveness of EMDR for the treatment of GAD and its main symptoms – pathological worry. Only one case study with confirmed effectiveness has been conducted on four individuals suffering from GAD who received 15 sessions of EMDR [8]. Another study examined the effectiveness of EMDR for stressful events of daily life, however, this was done in a single session on a non-clinical sample [30]. We decided to examine the hypothesis that EMDR is an effective treatment in reducing pathological worry of patients suffering from GAD.

METHOD

Participants

The participants were three women aged 25, 27 and 30 years referred to two selected clinics.

They had been assessed as fulfilling the DSM-IV-TR criteria for GAD through the Structured Clinical Interview for DSM-IV-TR axis I Disorders (SCID-I) by a clinician.

Inclusion criteria were:

– receiving no psychological therapy associated with GAD
– having an educational level higher than high school diploma or secondary school completion certificate
– having no severe personality disorder as defined in the Millon Clinical Multiaxial Inventory-III (MCMI-III)
– having no psychotic disorder, both at present and in the past
– no drug abuse
– not receiving psychiatric medications 4 months prior to treatment
– willingness to participate in the study.

As epidemiologic studies have shown a high rate of comorbidity of axis I disorders with GAD, participants with comorbid disorders were included in the study. However, GAD was considered as a primary disorder and more significant and intensive than the other disorders.

First participant

The first participant was a 27-year-old single woman who was referred to the counsellor due to problems such as lack of concentration, distraction and high stress. The main reason for her worry was a relationship of love and affection with a man that had left her after having an intercourse with her. Another concern was her mother who was suffering from Alzheimer's disease. She was afraid of uncertainty in the future, whether she can marry or not, and also of losing her mother and of loneliness. SCID interviews revealed GAD and a mild depression, but no sign of personality disorder (based on MCMI). In her past memories, high attachment to her mother, enjoying huge interest of the family, fear of competition at school and from friends in childhood, were evident. Present triggers were severe anxiety about communicating with others and mother's illness. Uncertainty, loss of mother and loneliness were mentioned as her fears for the future.

Second participant

The second participant was a 25-year-old divorced woman who had a 7-year-old son. She was referred to the counsellor due to chronic anxiety and uncertainty about the future of her son. She had persistent nightmares, low self-esteem, fear of rejection, accidents, and earthquakes. Her obvious concern was that her son might be kidnapped by his father. SCID revealed GAD along with several symptoms of depression. Memories of the past included the death of her father when she was a teenager. The present drivers were worries about her son and concerns for his future represented the unknown future of the participant.

Third participant

The third participant was a 30-year-old single woman with a postgraduate degree, but unemployed. The reason of her referral to the psychotherapist was suffering from chronic and unnecessary anxieties. For about 2 years, she had been dealing with worry. Her concerns began with the death of her grandmother. SCID showed GAD along with some symptoms of obsession. However, high levels of anxiety were more reported in her memories of the past included difficult childhood, fear of loneliness due to separation of parents, and losing her grandmother's support and attention through her death. Fear of the mother's death and anxiety in all aspects of life were the present drivers. Loneliness and having no purpose in life were among her fears of the future.

Procedure

After the diagnostic interview, considering the inclusion criteria and completing the pre-treatment assessments, five patients were considered to be eligible for the study. Prior to the treatment, one was excluded from the study due to lack of cooperation, therefore treatment was started with four participants. One of the participants abandoned the treatment sessions in the middle of the treatment process. Finally, data related to three individuals were presented for evaluation and analysis (Figure 1 – *next page*).
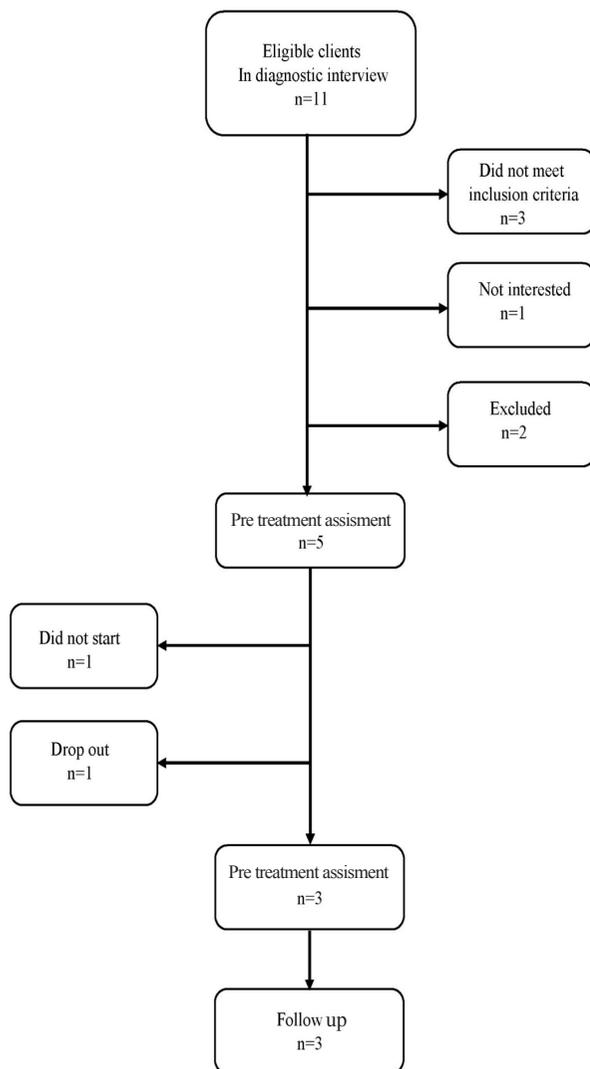
Figure 1 Participant flow chart for study phases

basic principles of single-case experimental designs and one of the most obvious differences between this method and a case study [31]. EMDR based on the standard protocol provided in Shapiro's handbook [10] was implemented over multiple sessions (depending on the client's need) and approximate time of an hour and a half. In the last treatment session, participants again completed all baseline tests. Also, to estimate the sustainability of the treatment effects, all three participants were followed up 1 month after the end of treatment.

MEASURES

Diagnostic and screening measures

All the questionnaires applied in the study had been translated into Persian and standardized on the targeted population by independent studies.

(1) Structured Clinical Interview for DSM-IV-TR Disorders-Axis I (SCID-I): Spitzer first developed this tool as a semi-structured interview [32, 33]. Kappa coefficient of 60% has been reported as the interrater reliability coefficient for SCID [34]. Sharif et al [35], after translating the SCID into Persian, tested it on a sample of 229 participants. The diagnostic agreement was moderate or good for most general and specific diagnoses (κ>60%) and the overall agreement was good as well (total review of the current diagnoses κ=52% and all lifetime diagnoses κ=55%).

(2) Generalized Anxiety Disorder Questionnaire-4 (GADQ-IV): this 9-item questionnaire is based on the diagnostic criteria of GAD in DSM-IV-TR. Newman [36] assessed its psychometric properties on the basis of studies conducted using this questionnaire. They concluded that a score of 7.5 was the optimal balance between sensitivity and specificity. A psychometric study on the Persian version of GADQ has showed Cronbach's alpha coefficient of 0.86 and suggested that the tool can be safely used for clinical diagnosis of GAD [37].

(3) Intolerance of Uncertainty Scale (IUS): Freeston & Rheaume [38] developed this scale to measure people's tolerance of unsafe situations

The relevant questionnaires were distributed among the participants at the baseline stage and during the first session. The treatment session was first started for the first patient. Then, during the second treatment session of the first patient, the second patient was entered into the treatment plan; and during the third treatment session of the first patient and the second treatment session of the second patient, the third patient entered into the treatment plan. Similarly, the forth patient entered into the treatment plan during the second treatment session of the third patient. The purpose of this evaluation was doing a frequent assessment, which is one of the

which indicate uncertainty. It has 27 items scored on a 5-point Likert scale. Buhr & Dugas [39] obtained its internal consistency as equal to α=0.94. Test-retest reliability coefficient was equal to 0.74 after 5 weeks. Research conducted by Hamidpour [40] also showed that IUS has good internal consistency and its alpha coefficient was calculated to be 0.88. Its test-retest reliability coefficient was equal to 0.76 after 3 weeks.

(4) Cognitive Avoidance Questionnaire (CAQ): Sexton & Dugas [41] developed this questionnaire containing 25 items assessing the tendency to use cognitive avoidance strategies [42]. Results of their study [41] showed that the CAQ's internal consistency was for the total scale of Cronbach's alpha coefficient of 0.95 and its test-retest reliability within 4–6 weeks was calculated to be 0.85. Hamidpour [40] also showed that the CAQ has a good internal consistency (Cronbach's alpha coefficient 0.86) and its test-retest reliability was equal to 0.80 within 2 months.

(5) Penn State Worry Questionnaire (PSWQ): This questionnaire was developed by Meyer et al [43] and contains 16 items which measure the severity of anxiety and uncontrollablility. PSWQ has a high internal consistency (Cronbach's alpha between 0.86 and 0.95). Its test-retest reliability was reported to be equal to 0.93–0.74 within 4 weeks. In addition, the results of normalization showed that the score of 41 diagnoses 50% and the score of 51 diagnoses 80% of people with GAD [44]. Hamidpour [40] also indicated that the PSWQ has a good internal consistency (Cronbach's alpha equal to 0.82) and its test-retest reliability was between 0.72 and 0.9 within 1 month.

6) Worry Domains Questionnaire (WDQ): a questionnaire developed by Tallis et al [45] to assess areas of worries. It has 25 items which measure individuals' worries in five areas (relationships, lack of confidence, lack of purpose for the future, work and financial affairs). Stober [46] calculated that the internal consistency of WDQ was 0.91. Subscales were also in the range of 0.72–0.88. Results of the study conducted by Hamidpour [40] also showed that WDQ had a good internal consistency (0.78) and its

test-retest reliability for the subscales was between 0.70 and 0.88.

Assessment of progress and outcome

Subjective Units of Distress (SUD) scale
This was first introduced in 1982 by Wolpe [10] It has 11 points, where 0 stands for 'indifferent' and 10 is the 'highest possible level of anxiety', and the participant is required to quantitatively determine their current level of mental distress. In the present study, the SUD was used to determine the baseline, to quantitatively determine the process of treatment impact at the end of each session, and finally, the effectiveness of all sessions. According to Shapiro, SUD could be considered as one of the few self-statements that can evaluate the changes in the target memory based on a scale of assessment [27].

Validity of Cognition (VOC) scale

Shapiro [47] uses VOC to measure changes in one's assessment of giving credit to the selection of a positive phrase or statement addressing oneself. This measurement is taken at the beginning of treatment, so that after expressing a negative opinion, the participant is asked to address him/herself in positive words (e.g. 'I am a valuable person'). Then he/she will be asked to evaluate the value of this positive recognition about her/himself on a 7-point scale, where 1 equals 'completely wrong' and 7 equals 'completely true'. Clinical reports suggest that by reducing anxiety and reprocessing the information implemented through eye movements, the validity of the positive recognition rises.
Data analytic plan
The current study, using the baseline single-case experimental design, implemented graph analysis, Reliable Change Index (RCI), Clinical Significances (CS), improved diagnosis, and six performance indicators for the analysis of data. Usually, when a questionnaire is used or implemented multiple times in a single-case experimental design, the question of whether the decrease in scores is due to the replications (multiple implementation) is raised. RCI can be used to answer this question. Initially, Jacobson & Truax

[48] developed RCI to analyze the data related to single-case experimental designs. In RCI, the post-treatment scores are subtracted from the pre-treatment scores and the result is divided by the standard error of the difference between these two scores. In order for the stable indicator to be statistically significant, the result should be equal to or greater than 1.96. In this case, it can be concluded that there is no relationship between recovery and the replication of the tests.

The CS method was used for the calculation of the data of this plan. The 'percentage of recovery formula' was also used to obtain the CS. The formula was first introduced by Blanchard & Schwarz [49] for data analysis in single-case experimental designs and it works by subtracting the pre-treatment score from the post-treatment score and dividing the result by the pre-treatment score. The efficiency (internal validity) was assessed by clinicians [50, 51] using six criteria, as shown in Table 1.

RESULTS

The baseline, first session, last session and follow-up scores obtained using the PSWQ, WDQ, IUS and CAQ scales are presented separately for the three participants in Table 2. Also, percentage of recovery, overall percentage of recovery and reliable change index were calculated. As indicated in the table, each participant's scores measured at the final session declined significantly compared with the first session and the baseline. This trend continued at 1-month follow-up. Percentage of recovery and overall percentage of recovery reflect the reduction in scores from pre-test to post-treatment and follow-up stages. Values of the reliable change index which are higher than 1.96 indicate that the observed changes were not due to a scales error or non-reliability of the tests.

For further evaluation of the results, six performance criteria (Table 1) were also analysed separately.

Table 1. Efficiency measurement criteria

Criterion	Explanation
Magnitude of change	To what extent the main targets of treatment were lessened?
Universality of change	What percentage of people has changed and what percentage has not changed?
Generality of change	How much change has occurred in other areas of life?
Acceptability	To what extent were the participants involved in the treatment process and how many completed it?
Safety	Has the treatment led to the increased mental and physical health of patients?
Stability	How long have the treatment outcomes lasted?

Table 2. Different indexes for measuring the changes in participants' scores

Scale	Participants	Baseline	1st S.	Last S.	POR	Overall POR	Follow-up	POR	Overall POR	RCI
PSWQ	P1	57	60	38	33		35	39	36	3.73
	P2	78	77	54	31	28	51	35		4.58
	P3	62	64	49	21		40	35		3.73
WDQ	P1	56	54	31	45		24	57	51	3.35
	P2	92	91	60	35	42	54	41		3.98
	P3	88	90	47	47		39	56		5.13

table continued on next page

IUS	P1	97	91	58	40		49	49		3.24
	P2	117	120	89	24	33	71	39	43	3.1
	P3	102	98	67	34		59	42		2.9
CAQ	P1	87	89	52	40		44	49		4.13
	P2	98	97	67	32	34	53	46	45	4.32
	P3	97	96	69	29		57	41		3.84

Magnitudes of change

PSWQ results indicated that all three participants achieved 28% recovery at the end of treatment. This value increased to 36% at follow-up (8% increase). WDQ questionnaire results indicated that to the extent, the participants have been successful in reducing their areas of worry. In total, 42% of patients achieved recovery by the end of treatment. This value increased to 51% at the follow-up stage (9% increase). Second participant had the lowest rate of recovery: 35% in the final stage and 41% at follow-up. IUS questionnaire results indicated that the first participant achieved 40% recovery in the final stage and 49% recovery in the follow-up stage, and the third participant achieved 46% recovery in the last stage and 52% recovery in the final stage. CAQ questionnaire results also indicated that the three participants were able to overcome their cognitive avoidance, but the rates were lower in the second participant than in two other participants. Thus, with 40% recovery in the final stage and 49% recovery in the follow-up stage, the first participant increased her recovery rate by 9%. The second participant achieved 33% recovery in the final stage and 47% in the follow-up stage, and the third participant achieved 33% recovery in the final stage and 54% at follow-up.

Universality of change

The overall percentages of recovery reveal that at the end of the follow-up stage, participants' recovery percentage has increased. As a result, all three had marked changes during the treatment process compared with baseline.

Generality of change

WDQ results indicated that to some extent, patients have successfully reduced their areas of worry. The first participant was recovered to 45% in the last stage and 57% in the follow-up stage, the second participant was recovered to 35% and 41% respectively and the third participant was recovered to 47% and 56% respectively. In total, the results indicated that the areas of worry for all three participants decreased after the use of EMDR.

Acceptability

One of the problems seen in some reports of clinical trials is the failure in reporting the drop in the status of the participants [52]. In this study, five participants were selected in the initial evaluation, but only three continued treatment until the last session. It is interesting to note that the second participant, suffering from many problems, was very satisfied. In fact, it could be said that due to high flexibility, EMDR can encourage patients to continue treatment.

Safety

Results of the tests used in this study indicated that in most cases the patients have recovered, although there were some fluctuations in the
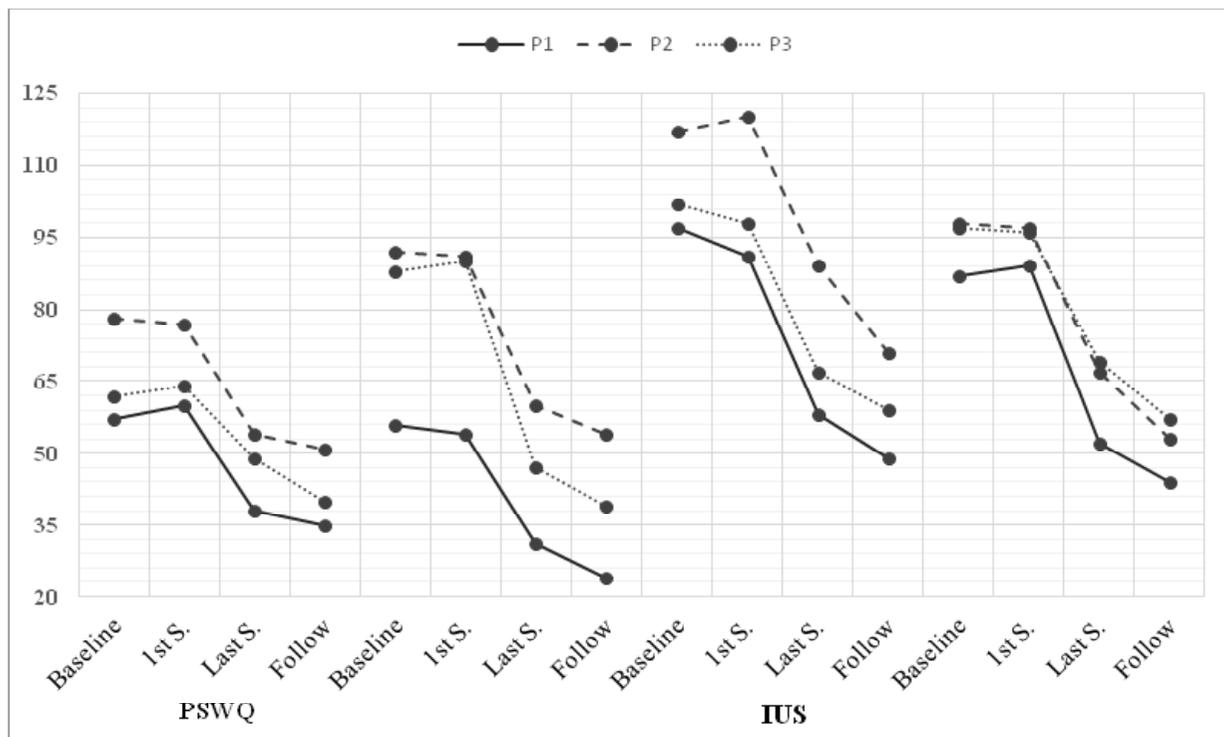
Figure 2. Trend of changes in the scores of PSWQ, WDQ, IUS and CSQ from baseline to follow-up. CSQ: Cognitive Avoidance Questionnaire; IUS: Intolerance of Uncertainty Scale; P: patient; PSWQ: Penn State Worry Questionnaire; WDQ: Worry Domains Questionnaire; S: session.

treatment process due to individual differences. Stability

Follow-up results at one month indicated that participants' worries decreased over time. Figure 2 compares the trend of changes in the scores of PSWQ, WDQ, IUS and CSQ separately for the three participants at baseline, first session, last session and follow-up stages. Figure 2.

Based on Table 3, the trend of changes in the participants' scores of SUD and VOC in several EMDR sessions can be compared. As is evident, with reduced symptoms of mental disturbance (reaching to the lowest level), the positive cognition increased (reaching to number 7). With regard to the second participant, due to her long-term problems she was not easily responding to treatment and needed a greater number of treatment sessions (13 sessions). The first and third participants received 8 and 9 treatment sessions, respectively. Table 3 – *next page*.

DISCUSSION

This study was conducted to examine the reduction of pathological worry in patients with

GAD through EMDR. After being qualified for treatment, participants went through the treatment process individually. Follow-up at 1 month was conducted. Observations showed that during EMDR the participants' negative images, emotions and cognitions decreased and gradually lost their reliability. Then, positive images, emotions and cognitions became alive and active.

The participants were also successful in reducing the extent of their areas of worry, although for the second participant the rate of recovery was not significant. She had problems in each of the five areas of worry (e.g. lack of confidence, lack of purpose for the future, occupation and financial affairs). Some researchers suggest [53] that an early onset of GAD and its long-term course are one of the main reasons for failure in achieving satisfactory results in psychotherapy. The fact that the second participant was a 25-year-old woman who had lost her father when she was a teenager and had been suffering from GAD for about 9 years can explain the issues with recovery. Also, depression and lack of trust in treatment [54] can also account for this partici-

Table 3. Scores of Subjective Units of Distress (SUD) and Validity of Cognition (VOC) for the three participants (P1, P2, P3)

Scale	Participants	Sessions												
		1	2	3	4	5	6	7	8	9	10	11	12	13
SUD	P1	10	9	10	8	7	5	3	1					
	P2	10	10	9	9	8	7	7	6	5	5	4	3	2
	P3	9	9	7	8	6	4	3	2	1				
VOC	P1	2	3	3	5	5	6	6	7					
	P2	1	2	2	2	3	3	3	3	4	3	5	6	7
	P3	1	2	4	4	5	5	6	6	7				

pant's lower rate of recovery and a longer course of treatment.

The first participant had poor interpersonal relationships; loneliness, lack of self-confidence and purposelessness were her other areas of worry. In their study, Borkovec et al [55] concluded that poor interpersonal relations make people with GAD unable to achieve desirable treatment results. Thus, areas of worry of the first participant and those of the third participant (lack of purpose for the future and lack of a job) could have influenced the treatment outcome.

It is worth mentioning that all three participants had high scores in the field 'lack of confidence'. These results are consistent with the report presented by Tallis et al [56], where patients with GAD scored highly on the subscale of lack of confidence. That is why most people with worry have negative orientation towards their problems, exaggerate the problems, do not trust their own solutions and are pessimistic about the solutions proposed by others [42].

EMDR increased tolerance to uncertainty in patients with GAD. Dugas et al [57] concluded that intolerance of uncertainty is a structure unique to the cognitive model of GAD and therefore it should be the target of treatment with cognitive therapy. In fact, through identifying behaviours with high levels of uncertainty and behavioural exposure to them, the level of tolerance for uncertainty can be increased. Since EMDR is a form of confrontation with disturbing memories, one can expect that it is effective in reducing uncertainty. Our results indicate that the uncertainty tolerance in the second participant was less elevated than for two other participants. Durham et al [58] suggested that early onset of GAD, its chronic course, strained interpersonal relation-

ships with the spouse and family, high trait anxiety and symptom intensity are factors that prevent patients with GAD from achieving positive treatment outcomes. Most of these were true for the second participant.

Our results also indicated that all three participants were able to overcome their cognitive avoidance. Cognitive avoidance is one of the main components of the cognitive model of GAD [42]. In EMDR, clients should think unpleasant thoughts and images, which can reduce cognitive avoidance of worry. Anxious and worried people try to achieve peace through avoiding disturbing thoughts, while in cognitive-behavioural approaches avoidance is considered one of the most important factors in maintaining psychological disorders [59, 60]. During EMDR, disturbing mental images become active and the cognitive avoidance of individuals with GAD is reduced through exposure to those images.

The 1-month follow-up results also showed that participants' worries have declined. The nature of EMDR could be one of the reasons for this decline, as after treatment people should be able to overcome their problems without the need for a therapist. However, follow-up at 1 month to which we were restricted was too short a period of time to draw any definite conclusions.

In general, the results of this study show that the pathological worry of individuals with GAD declined after EMDR. However, the study would merit a repeat. Although we attempted to observe correctly and as much as possible the methodological principles, it is suggested that the study should be conducted on a larger sample composed of men with GAD within the framework of pilot projects to provide more reliable results. Having a single-gender sample was

another limitation of the current study which could be overcome by future research.

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