

Effect of Eye Movement Desensitization and Reprocessing Technique on Depression and Post-Traumatic Stress Symptoms among Emergency Nurses

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Abstract

Background: Emergency department nurses often work in challenging workplace situations, which can cause mental health issues such as depression and post-traumatic stress symptoms that, as a sequence, negatively impact their personal and professional well-being. The eye movement desensitization and reprocessing (EMDR) technique is a structured therapy that facilitates healing from emotional disturbance caused by distressful life experiences. So, the aim of this study was to evaluate the effect of eye movement desensitization and reprocessing technique on depression and post-traumatic stress symptoms among emergency nurses.

This study was carried out using a quasi-experimental design at the Emergency Departments of Accidents Hospital, Obstetrics and Gynecology Hospital, and Pediatrics Hospital at Zagazig University Hospitals, Sharkia Governorate, Egypt. The study included a sample of seventy-five emergency nurses who met the inclusion criteria. The study's data were collected using the following tools: a structured interview questionnaire composed of two parts (a demographic data sheet and a work data sheet), the Beck Depression Inventory-Second Edition (BDI-II), and the Post-Traumatic Stress Disorder Checklist for the DSM-5 (PCL-5).

Results: The findings of this study showed highly significant improvement ($p < 0.0001$) in levels and mean scores of depression as well as post-traumatic stress symptoms after application of the EMDR technique compared with pre-application of the EMDR technique.

Conclusions: Eye movement desensitization and reprocessing technique was effective in reducing depression and post-traumatic stress symptoms among emergency nurses. Therefore, it is recommended to replicate the study using a larger probability sample of nursing staff to help for generalization of the results and confirm the effectiveness of eye movement desensitization and reprocessing technique.

Key words: Depression symptoms, Emergency nurses, Eye Movement, Post-traumatic stress symptoms

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Introduction:

Emergency departments (EDs) are the hospitals' front doors where patients with emergencies can seek assistance at any time of the day without an appointment ^[1]. Emergency nurses may experience mental health issues from their work due to the nature of their fast-paced field and many

emergencies. They are subjected to traumatic stressors of various severity and types during their daily routine work. Nurses could often feel that these stressors (i.e., noisy and crowding environment, hostility of patients and their relatives) are threatening as they are not prepared to handle them, which can lead to an increase in depressive and post-traumatic stress symptomatology among nurses [2].

Depression is a mood disorder that affects about 350 million people in the world. In Egypt, over 2.5 million people are estimated to experience depression [3]. Depression is a mood disorder that involves a low mood and a lack of interest in pleasurable activities. Tiredness and poor concentration are also related symptoms. It can also affect appetite and sleep. Depression can be long-lasting or recurrent and lead to impairment in the interpersonal, social, and work-related functioning of depressed health care workers, which may influence other aspects such as the quality of patient care and communication with patients [4].

Post-traumatic stress disorder (PTSD) is approximately 3.9% of the population worldwide [5]. PTSD is a psychiatric disorder that may occur in individuals who have experienced or witnessed a traumatic event or series of events. Symptoms of PTSD are split into four main classes: intrusive symptoms, avoiding reminders of the event, negative alterations in thoughts and feelings, and hyperarousal symptoms (overreacting to situations) [6]. Emergency nurses are likely to experience unpredictable work-related stressors (e.g., sudden death, critical trauma cases, violent behavior) leading to post-traumatic stress disorder symptoms [7].

The EMDR technique is an evidence-based approach that manages the whole person, addressing individual, interpersonal, and behavioral aspects. It is aimed at enhancing the ability to respond positively and adaptively to disturbing life experiences while building resilience and promoting personal growth [8]. A core feature of EMDR is pairing the emotional activation of a painful memory with bilateral stimulation, such as through eye movements. It is a protocol of eight phases, beginning with history taking, followed by preparation, assessment of targets, active desensitization and processing, instillation of positive cognition, and ending with closure and re-evaluation [9].

The key element of the EMDR technique is the use of bilateral stimulation (BLS) while the individual retrieves the emotional memories. During EMDR sessions, bilateral stimulation is thought to desensitize the disturbance caused by negative experiences and improve traumatic memory processing by altering functional brain connectivity [10]. The initial form of EMDR technique demands the bilateral rhythmic moving of the therapist's fingers to be followed by the individual's eye, which simultaneously recalls a painful memory to effect desensitization to that memory [11].

Eye movement desensitization and reprocessing is a type of psychotherapy for post-traumatic stress disorder (PTSD). In addition, a positive effect was noticed in several conditions, specifically mood disorders, reactions to severe stress, anxiety disorders, and sleep. During a therapeutic session, individuals with PTSD had to do a series of eye movements at different times. The technique works to assist in modifying and reprocessing maladaptive memories that are believed to be pivotal to this problem. As a result, the symptoms lessened [12].

Significance of this study:

Emergency department nurses are frequently subjected to stressful situations, which can affect their mental state, leading to the onset of depression and post-traumatic stress symptoms [13]. Depression and post-traumatic stress disorder are estimated to affect approximately 3.4% and 0.2%

of the population in Egypt^[14]. The mental health problems of nurses negatively disturb their clinical decision-making, contributing to the occurrence of medical errors^[15]. Eye movement desensitization and reprocessing is a powerful technique for managing depression and post-traumatic stress disorder. There are scarce studies on the use of this technique in Egypt in the field of nursing. So, this study was conducted to evaluate the effect of eye movement desensitization and reprocessing technique on depression and post-traumatic stress symptoms among emergency nurses.

Aim:

This study aimed to evaluate the effect of eye movement desensitization and reprocessing technique on depression and post-traumatic stress symptoms among emergency nurses.

Subjects and methods

Research Hypotheses:

1. Depression symptoms among emergency nurses will be decreased after the implementation of eye movement desensitization and reprocessing technique.
2. Post-traumatic stress symptoms among emergency nurses will be decreased after the implementation of eye movement desensitization and reprocessing technique.

Design:

A quasi-experimental pretest and posttest design was used in this study.

Subjects:

A seventy-five emergency nurses who met the inclusion criteria and worked at the Emergency Departments of the Accidents Hospital, Obstetrics and Gynecology Hospital, and Pediatrics Hospital at Zagazig University Hospitals, Sharia Governorate, Egypt.

Inclusion criteria:

1. Accept to participate in the study.
2. Both sexes.
3. Work in the previously mentioned settings for more than one month.

Exclusion criteria:

1. Eye problems (eye pain, eye muscle weakness), or hearing impairments.
2. Medical problems (asthma, high blood pressure, cardiac diseases).
3. Pregnancy.
4. History of any psychiatric or neurological illness (epilepsy or psychosis).

Sample size:

A purposive sample was selected from all emergency nurses working in the previous settings during the time of the study (N = 75). The total number of nurses who worked in the three emergency departments of the selected settings and dealt with all types of emergency cases was 107, but 32 of them were excluded from the study. Finally, the sample included 75 nurses: 45 nurses working at the emergency department of Accidents Hospital, 15 nurses working at the emergency department of

Obstetrics and Gynecology Hospital, and 15 nurses working at the emergency department of Pediatrics Hospital.

Tools:

The study's data were collected using the following tools:

Tool (I): A structured interview questionnaire:

The researchers created a specially designed structured interview questionnaire with two parts to gather the data required for the study in view of the most recent literature:

Part one: Personal characteristics sheet:

This sheet was used to assess the personal characteristics of the nurses who participated in the study, such as age, residence, gender, marital status, number of children, and educational qualification.

Part two: Job characteristics sheet:

This sheet was used to assess the job characteristics of the nurses, such as working shift, working place, working hour per week, and experience in the emergency department.

Tool (II): Beck Depression Inventory-Second Edition (BDI-II):

This tool was designed by Beck et al. [16] to determine depression symptoms' existence and severity over the past two weeks. The BDI consists of 21 items that assess physical, emotional, and cognitive symptoms of depression.

Scoring system:

A 4-point Likert scale from 0 to 3 was utilized to rate all items. The level of depression can be evaluated as follows: 0–13 is considered minimal, 14–19 is mild, 20–28 is moderate, and 29–63 is severe depression symptoms.

Tool (III): Post-Traumatic Stress Disorder Checklist for DSM-5 (PCL-5):

This tool was designed by Weathers et al. [17] to determine post-traumatic stress symptoms' existence and severity over the past month. It consists of 20 items that correspond with the DSM-5 criteria for PTSD and are categorized into four clusters of post-traumatic stress symptoms, including intrusive symptoms, hyperarousal symptoms, negative alteration in cognition and mood, and avoidance symptoms.

Scoring system:

A 5-point Likert scale from 0 to 4 was utilized to rate all items. The level of PTSD symptoms can be evaluated as follows: 0–19 is considered minimal, 20–30 is considered mild, 31–40 is considered moderate, and 41–80 is considered severe. A cutoff of 31 is considered a reasonable value for probable PTSD.

Reliability and validity:

The instruments were presented to five experts from the psychiatric and mental health nursing department at the faculty of nursing and the psychiatry department at the faculty of medicine, Zagazig University. The instruments were evaluated for relevance, comprehensiveness, clarity, and applicability. Cranach alpha coefficients were calculated to assess the instruments' internal consistency (reliability), as demonstrated:

Depression inventory	0.859
PTSD checklist	0.779

Pilot study:

A pilot study included 10% of the calculated sample from the study setting to evaluate the tools' viability and clarity while also determining how long it would take to complete the data gathering forms.

Ethics approval

The Committee of Research Ethics at Zagazig University's Faculty of Nursing approved the study protocol (M.D.ZU.NUR192115/2/2022). After a thorough explanation of the study's aim, each of the emergency nurses signed a written consent form. Participants were given the option to refuse participation. They were also assured that the information would be kept confidential and used solely for research purposes.

Fieldwork:

Before the beginning of the research, the researchers took a training course on eye movement desensitization and reprocessing technique in the center of psychiatry Zagazig University. Three days hours per week for two weeks, theoretical and practical training.

The study was carried out over a six-month period. The researchers allocated three days weekly; Sunday, Tuesday, and Thursday on various shifts to collect data (as the hospital was responsible for receiving patients on these three days each week).

Because nurses worked in shifts, the sessions were planned according to the days and hours that the nurses could attend. The sessions were held between morning and evening shifts for the nurses at rate three sessions per week on three days throughout a period of four months depending on their response and self-reported progress

The total number of nurses that were interviewed per day was 3-4 nurses. The nurse was interviewed in empty separate room. The duration of each session was variable (ranged from 45 to 60 min) according to emergency nurse's ability and active participation, as well as the time available, and the content of each session. The researcher was available all the time in WhatsApp to answer the nurses questions and schedule a time for the subsequent sessions.

The process of data collection included four phases; the assessment, planning, implementation and evaluation phases. Concerning the assessment phase, it related to baseline data collection (pretest), which took a month, while the planning and implementation phases took about four months. This period involved the provision of sessions content (10 session). At first, the researchers gave theoretical information (session 1) about depression, post-traumatic stress symptoms, and psychoeducation about eye movement desensitization and reprocessing technique.

Then, they began the practical part of the EMDR technique for each nurse (sessions from 2 to 10). After this period, the researchers evaluated the degree of improvement in emergency nurses' depression and post-traumatic stress symptoms through a post-test, which took about a month. The study was carried out over a six-month period.

EMDR Technique

During the EMDR technique, eye movements for bilateral stimulation were used. A higher number of eye movement sets were performed, depending on the time in each session. An average of fifteen sets were performed in each session. Each set equals 24–30 passes back and forth according to the nurses' responses.

The researchers considered the following mechanics during the reprocessing phases: Firstly, the speed of eye movements (BLS) was tolerable for the nurses. Secondly, alternative directions (horizontal or diagonal) were used when there was no change or improvement in the sessions. Further, the researchers used two methods for eye movements (bilateral stimulation). Firstly, visual stimulation by following the horizontally moving researchers' fingers. Secondly, auditory stimulation by hearing sound via a head set connected to an EMDR application downloaded on a laptop by the researchers.

The nurses were invited to process the three prongs of EMDR as follows: the past, present, and future aspects of the disturbing event, focusing on the past memory at first. Then the present triggers were reprocessed repeating 3-6 phases of EMDR technique.

The EMDR technique was carried out in eight phases in accordance with the EMDR standard technique:

The First Phase (History Taking): The researchers took a complete history of the nurses and gathered information about their life supports, positive strengths, and self-control strategies they used to utilize to face life stressors. In addition, emergency nurses were asked about their traumatic experiences that have caused them the most discomfort. Accordingly, the researchers completed a proper assessment of the past memories, present triggers, and future anxieties and developed a treatment plan that included the targets needed to be reprocessed and the channels of each target. Finally, the researchers clarified the goals of the EMDR technique for nurses. This phase continued for one session for nurses.

The Second Phase (Preparation): The researchers prepared the nurses to handle the disturbance that may arise in EMDR processing, making sure that they had all of the resources needed to begin the reprocessing phases. The researchers taught nurses relaxation techniques that they could utilize in and between sessions, such as calm place exercises, deep breathing, and stop signal. In addition, the researchers gave instructions to nurses and set expectations about the EMDR technique, addressed nurses' fears, tested the eye movements, and clarified the mechanics of the technique (horizontal or diagonal direction, speed was fast, and distance was 30 cm). As a result, the nurses began to feel more confident and comfortable. This phase continued two sessions for all nurses.

The Third Phase (Assessment): The researchers activated the memory that was being targeted in this session by asking nurses to think of the disturbing event and recognize its components. The most distressing image that represented the event was the negative cognition associated with the image, the positive cognition, which was generally a 180-degree shift from the negative cognition, the physical sensations that stimulated when concentrating on the event, the emotions that evoked when pairing the image with the negative cognition.

Also, the researchers asked nurses to indicate the intensity of negative feelings via the subjective units of distress (SUD) scale. The SUD scale is a scale from 0 to 10, where 0 indicates no disturbance and 10 indicates the highest disturbance. The researchers also used the validity of cognition (VOC) scale to determine the validity of positive cognition. The VOC scale is a scale from 1 to 7, where 1 feels completely false and 7 feels completely true.

Reprocessing phases of EMDR technique include desensitization phase, instillation phase, and body scan phase.

The Fourth Phase (Desensitization): The researchers asked nurses to emphasis on the image, negative cognition, emotions, and body reactions linked to the disturbing event (target). At the same time, they were asked to move their eyes for many sets from side to side following the horizontally moving researchers' fingers or the sound of the EMDR application that was heard by the headset, providing an alternating dual-attention stimulus.

The researchers got feedback from nurses after each set of eye movements and continued doing as many sets of bilateral stimulation until negative feelings intensity reduced on the subjective units of distress scale (SUD) scale and positive changes occurred. The desensitization phase continued for two sessions if $SUD < 5$, and for 3–4 sessions if $SUD > 5$. The desensitization phase was completed when emotions, negative cognition, and sensations were changed and SUD decreased to 0-2. The researchers didn't proceed with the instillation phase until the desensitization phase was completed.

The Fifth Phase (Instillation): The researchers asked the nurses to access the target memory while holding positive cognition in mind and engaging in bilateral stimulation until it reached the maximum degree of acceptance on the validity of cognition (VOC) scale. The researchers got feedback from nurses after each set of eye movements to assess the VOC rating and continued doing as many sets of eye movements (bilateral stimulation) until positive cognition strengthened to the maximum levels on the VOC scale. The instillation phase continued for one session if $VOC > 2$, and for two sessions if VOC 0-2. The instillation phase was not completed when $VOC < 5-7$. The researchers didn't proceed to the body scan phase until the instillation phase was completed (VOC increased to 5-7).

The Sixth Phase (Body Scan): The researchers asked the nurses to hold in mind both the target event and the positive belief and mentally scan the body. The researchers then asked the nurses to concentrate on any residual bodily discomfort and engage in eye movements (BLS) until it was resolved. The researchers got feedback from nurses after each set of eye movements and continued the dual-attention stimulus until bodily discomfort was good. The body scan phase continued for one session.

The Seventh Phase (Closure) was used by the researchers at the end of each reprocessing session, except for the sessions of phase one and phase two. The researchers informed the nurses that processing may continue after the session, guided the nurses to use their calm place as a relaxation technique to re-establish emotional stability and keep it controlled and safe until the next session, and asked the nurses to observe and log significant observations.

The Eighth Phase (Reevaluation) occurred at the beginning of each reprocessing session to evaluate the outcomes of the previous session, and after all the reprocessing sessions were over, to assess the degree to which the goals of EMDR had been met. The researchers used SUD and VOC scales in this phase. The researchers repeated the desensitization phase in nurses whose SUD increased > 2 until it decreased again.

Statistical Analysis:

Statistical analysis was performed using the SPSS 23.0 statistical software. For qualitative variables, frequency and percentage were calculated, while mean, median, and standard deviation were calculated for quantitative variables. The non-parametric Mann-Whitney or Kruskal-Wallis tests and paired t test were used to compare quantitative continuous variables. A Friedman test was used to compare qualitative variables. The Fisher exact test was used whenever the expected values in one or more cells of a 2x2 table were less than 5. A P-value of <0.05 was used to indicate statistical significance.

Results:

Regarding the studied emergency nurses' personal and job characteristics, **Table 1** shows that 84% of them were aged from 21 to 30 years, 56% were females, and 77.3% lived in rural areas. Considering marital status, 56% of them were unmarried. As well, 61.3% had no children. As to educational qualifications, the highest percentage had a technical degree in nursing (57.3%). This table also demonstrates that the highest percentage of nurses worked rotating shifts (57.3%), affiliated with the emergency department of the Accidents Hospital (61.3%), and worked less than 48 working hours per week (60%). Moreover, 52% of them had experience in the emergency department for less than two years.

Table 2 expounds that, before the EMDR technique, the highest percentage (38.7% and 41.3%) of emergency nurses had moderate and severe levels of depression symptoms. Meanwhile, only 0% and 20% of emergency nurses had minimal and mild levels, respectively. As against, after applying the technique, only 24% and 6.7% had moderate and severe levels of depression symptoms, respectively. Meanwhile, 24% and 45.3% had minimal and mild levels, respectively. These variations were highly statistically significant.

Figure 1 clarifies that the depression symptoms' total mean score was statistically and significantly diminished among the studied emergency nurses from 29.24 ± 9.43 pre-EMDR technique sessions to 17.38 ± 5.81 post-EMDR technique sessions.

Table 3 shows that the mean score of the post-traumatic stress symptoms' four clusters was statistically and significantly improved among the nurses. As evidence, the mean score of negative alteration in cognition and mood, hyperarousal symptoms, intrusive symptoms, and avoidance symptoms decreased after applying the EMDR technique. Besides, a highly statistically significant reduction in the mean score of emergency nurses' total posttraumatic stress symptoms from 37.01 ± 8.62 before the technique to 23.51 ± 5.78 after the technique was revealed.

Table 4 indicates that, before implementing the EMDR technique, the percentage of emergency nurses who had moderate post-traumatic stress symptoms was 52%, while after implementing the EMDR technique, a highly statistically significant improvement was revealed, and this percentage decreased to only 4%. Reversely, there were 25.3% of total nurses with mild post-traumatic stress symptoms before implementing the EMDR technique, which increased to 73.3% after the technique ($p < 0.001$).

As to **Table 5**, the depression symptoms score was significantly and positively correlated with the scores of intrusive symptoms, hyperarousal symptoms, avoidance symptoms, and negative alteration in cognition and mood. As well, the score of intrusive symptoms was significantly and positively correlated with the avoidance symptoms scores. Also, the score of hyperarousal symptoms was significantly and positively correlated with the score of a negative alteration in cognition and mood.

From Table 6, it is obvious that the nurses' intrusive symptoms score and each of their age and rotating shifts were significantly and negatively correlated. As well, the correlations between the score of negative alteration in cognition and mood and each of age, number of children, and experience in the emergency department were negative and highly significant. Also, the hyperarousal symptoms score had highly statistically significant negative correlations with marital status (unmarried), number of children, and experience in the emergency department, while there was a statistically significant positive correlation with working hours.

Table 6 also illustrates that the emergency nurses' depression symptoms score had highly statistically significant negative correlations with their age, marital status (unmarried), number of children, rotating shifts, and experience in the emergency department, while a statistically significant positive correlation with their educational qualification was found.

As evident from Table 7, the emergency nurses' depression symptoms score significantly decreased with increasing experience in the emergency department. As well, the intervention significantly improved the depression symptoms score. As indicated by the r-square value, the model explains 27% of the change in this score.

Table 8 reveals that the nurses' experience in the emergency department was a statistically significant independent negative predictor of their post-traumatic stress symptoms score. As well, the intervention significantly improved the post-traumatic stress symptoms score. As shown by the value of r-square, 15% of the variation in this score was explained.

Table 1: Demographic and work characteristics of the studied emergency nurses (N = 75)

characteristics	Frequency	Percent
Personal characteristics		
Age group: /year		
21- 30	63	84.0
31- 40	12	16.0
Gender:		
Male	33	44.0
Female	42	56.0
Residence:		
Rural	58	77.3
Urban	17	22.7
Marital status:		
Married	33	44.0
Unmarried [Single- Widower/ divorced]	42	56.0

No. of children:		
No children	46	61.3
Have children	29	38.7
Educational qualification:		
Diploma in nursing	8	10.7
Technical institute of nursing	43	57.3
Bachelor in nursing	19	25.3
Postgraduate	5	6.7
Job characteristics		
Working shifts:		
Fixed	32	42.7
Rotating	43	57.3
Working place:		
ED of Accidents Hospital	46	61.3
ED of Obstetrics & Gynecology Hospital	15	20.0
ED of a Pediatric Hospital	14	18.7
Working hours/ week:		
< 48 hours	45	60.0
≥ 48 hours	30	40.0
Experience in emergency department:		
< 2 years	39	52.0
≥ 2years	36	48.0

Table 2: Depression symptoms' total level among the studied emergency nurses pre- and post-EMDR technique (N=75)

Depression symptoms level	Pre (n=75)		Post (n=75)		<i>Friedman test</i>	(p-value)
	No	%	No	%		
Minimal depression	0	0.0	18	24.0	70.00	< 0.001**
Mild depression	15	20.0	34	45.3		
Moderate depression	29	38.7	18	24.0		
Severe depression	31	41.3	5	6.7		

***: Highly significant*

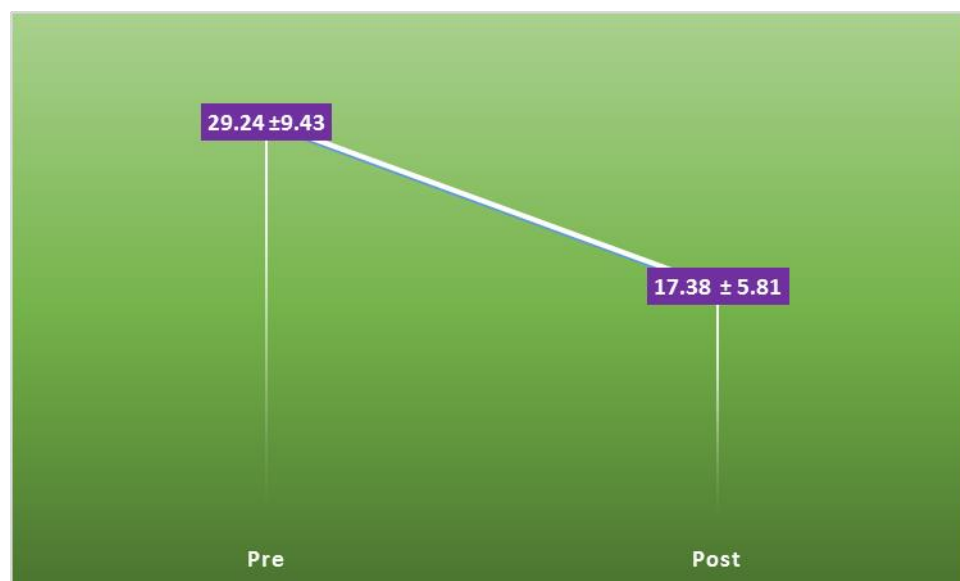


Figure 1: Depression symptoms' total mean score among the studied emergency nurses pre- and post-EMDR technique (N = 75)

Table 3: Post-traumatic stress symptoms mean scores among the studied emergency nurses pre- and post-EMDR technique (N = 75)

Clusters		Pre (n=75)		Post (n=75)		T-test	(p-value)
		M	SD	M	SD		
B	Intrusive symptoms	9.69	3.07	6.17	2.27	20.68	< 0.001**
C	Avoidance symptoms	4.19	1.81	3.31	1.69	6.99	
D	Negative alteration in cognition and mood	13.17	3.65	7.59	2.31	22.57	
E	Hyper arousal symptoms	9.96	3.50	6.44	2.33	16.76	
Total post-traumatic stress symptoms		37.01 ± 8.62		23.51 ± 5.78		26.79	

**: Highly significant

Table 4: Total post-traumatic stress among emergency nurses pre- and post-EMDR technique (N = 75)

Posttraumatic stress level	Pre (n=75)		Post (n=75)		Friedman test	(p-value)
	No	%	No	%		
Minimal PTSD (0-< 20)	0	0.0	15	20.0	66.00	< 0.001**
Mild PTSD (20-30)	19	25.3	55	73.3		
Moderate PTSD (31- 40)	39	52.0	3	4.0		
Severe PTSD (41-80)	17	22.7	2	2.7		

**: Highly significant

Table 5: Correlation between emergency nurses' depression and post-traumatic stress symptoms scores post-the technique.

	Depression symptoms	Intrusive symptoms	Avoidance symptoms	Negative alteration in cognition and mood	Hyper arousal symptoms
Depression symptoms					
Intrusive symptoms	.378**				
Avoidance symptoms	.237*	.276*			
Negative alteration in cognition and mood	.589**	.175	.120		
Hyper arousal symptoms	.526**	.090	.073	.277*	

R: Pearson's correlation coefficient (*) statistically significant at $p < 0.0$ (**) statistically significant at $p < 0.01$

Table 6: Correlation between depression and post-traumatic stress symptoms cluster scores, and emergency nurses' demographic and work characteristics.

Characteristics	Spearman's rank correlation coefficient				
	Intrusive symptoms	Avoidance symptoms	Negative alteration in cognition and mood	Hyper arousal symptoms	Depression symptoms
Age	-.227*	-.080	-.396**	-.178	-.579**
Marital status [unmarried]	-.056	-.018	-.028	-.262*	-.361**
Children No.	-.178	-.131	-.287*	-.310**	-.531**
Educational qualifications	.083	.199	.060	.068	.272*
Working shifts [rotating]	-.245*	-.028	-.174	-.214	-.229*

Working hours/week	.191	.126	.206	.233*	.165
Experience in emergency department	-.191	-.100	-.408**	-.308**	-.557**

(*) Statistically significant at $p < 0.05$ (**) statistically significant at $p < 0.01$

Table 7: Best fitting multiple linear regression model for depression symptoms score

Characteristics	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	23.707	1.341		17.679	.000	21.035	26.380
Intervention	10.73	2.04	0.24	5.254	.000	6.70	14.76
Experience in emergency department	-3.703	.709	-.521	-5.220	.000	-5.117	-2.290
R-square=0.27							
Model ANOVA: F=27.25 $p < 0.001$							

Table 8: Best fitting multiple linear regression model for post-traumatic stress symptoms score

Characteristics	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	26.934	4.510		5.972	.000	17.939	35.930
Intervention	22.51	1.61	0.61	13.947	.000	19.32	25.69
Experience in emergency department	-2.781	1.280	-.394	-2.173	.033	-5.334	-.228
R-square=0.15							
Model ANOVA: F=13.17 $p < 0.001$							

Discussion

Emergency nurses are frequently faced with several distressing events that can lead to trauma-related mental health illnesses, such as depression, post-traumatic stress disorder, and anxiety. A flow-on consequence of such mental health issues is associated with increased medical errors^[18]. The eye movement desensitization and reprocessing technique is a novel and innovative therapeutic modality for several mental health issues^[19]. This study aimed to evaluate the effect of eye movement desensitization and reprocessing technique on depression and post-traumatic stress symptoms among emergency nurses.

Concerning the characteristics of the studied emergency nurses, the current study results clarified that the majority of nurses were aged from 21 to 30 years. More than half of them were female, unmarried, had no children, and had a technical degree in nursing. Also, the current study results detected that three-fifths of these nurses had experience equal to or less than five years in the nursing profession and worked less than 48 working hours per week. Besides, more than half of the nurses worked rotating shifts and had less than two years of experience in the emergency department.

The first hypothesis was supported by comparing the depression symptoms' mean score and levels pre- and post-EMDR technique, indicating the outstanding effect of the technique. Pre-implementation of the EMDR technique, the current study results alluded to that the largest proportion of the studied emergency nurses had a high total mean score and levels of depression symptoms, as nearly two-fifth of them had severe symptoms. This might be related to that the nurses in the emergency department tolerate psychological and physical loads such as heavy rescue tasks, critical cases, and deaths, which, in turn, create negative emotions, especially depression.

These findings are in conformity with a study in Jordan by **Oteir et al.**^[20] who clarified that the highest percentage of frontline nurses in their study showed severe signs of depression. Also, concordant results were reported by the **Bazmandegan et al.**^[21] study in Iran, which indicated that most participants had medium and intense depression. Additionally, **Fu et al.**^[22] in their study in China revealed a high level of depressive symptoms among the groups of nurses with different workplace violence experiences.

Whereas, after implementation of the EMDR technique, the current study results showed significant improvement in the depression symptoms' total mean score and levels among the studied emergency nurses, as only less than one-tenth of emergency nurses had severe depression symptoms. This could be because the EMDR technique focuses on resolving the distressing situations that were maladaptive stored in the brain through stimulating the brain's natural healing processes.

These findings were approved by a study conducted in Italy by **Perri et al.**^[23] to compare the efficacy of EMDR and Cognitive-Behavioral Therapy for health professionals suffering from the circumstances imposed by the coronavirus disease. The study depicted that the depressive symptoms mean score was reduced after EMDR sessions by twelve points on the depression inventory. Similarly, **Saint-Jammes et al.**^[24] conducted a study in France to examine whether EMDR early interventions may provide psychological support to healthcare professionals. The main results revealed that EMDR was effective and produced a significant reduction in symptoms of depression after seven sessions.

These findings are also in harmony with a study in France by **Caille et al.**^[25], to assess the efficacy of EMDR usual care for health care workers, which clarified a significant improvement in depression scores after EMDR interventions. This is contradictory with a study by **Jiménez et al.**^[26] in Mexico, who verified that the mean comparison of depression symptoms between pre- and post-EMDR interventions did not show a significant effect, and the decrease in the treatment group was unclear at the posttest.

The present study also hypothesized that "post-traumatic stress symptoms among emergency nurses would be decreased after the implementation of eye movement desensitization and reprocessing techniques." As revealed in the study findings, before the implementation of the EMDR technique, the highest percentage of the studied emergency nurses had moderate post-traumatic stress symptoms, which might be due to the fact that emergency departments are stressful workplaces in which the nurses routinely confront several traumatizing conditions. Some of them are cases with burns and broken bones, witnessing deaths, or life-threatening conditions such as heart attacks.

These results are in alignment with a study carried out by Fernandez et al. [27] in Italy to evaluate the effectiveness of EMDR therapy in a sample of Italian healthcare workers. Results showed that the majority of the subjects had pathological PTSD symptoms before EMDR application. Likely, a study by Gold [28] in the USA to describe how nurses can prevent and improve the symptoms of post-traumatic stress disorder through EMDR interventions to optimize sleep illustrated that the largest portion of nurses reported higher PTSD scores before EMDR therapy.

After the implementation of the EMDR technique, the current study results depicted a highly statistically significant reduction in all post-traumatic stress symptoms scores, as the percentage of nurses who had moderate post-traumatic stress symptoms decreased and the majority of them had mild post-traumatic stress symptoms. The effectiveness of the EMDR technique could be explained by the fact that it allows the traumatic conditions to be processed cognitively, emerge in a more adaptive shape, and recover without negative emotions, subsequently eliminating post-traumatic stress symptoms after EMDR.

In agreement with the aforementioned study results, a previous study carried out by Yurtsever et al. [29] in Turkey, which aimed to investigate the effect of EMDR therapy on PTSD levels of high-risk groups during the pandemic, showed that there was a significant decrease between the pre-test and post-test mean scores of frontline professionals on PCL-5 after EMDR sessions. Correspondingly, a study by Belvedere et al. [30] in Italy also assured that the level of post-traumatic stress in a sample of healthcare workers decreased after the EMDR compared with baseline. Likewise, a study by Morris et al. [31] in United States revealed a statistically significant reduction from a mean PCL-5 score at the end of the EMDR.

The results also coincided with a study carried out by Farrell et al. [32] in United Kingdom to investigate the effectiveness of EMDR therapy in the treatment of PTSD, which highlighted that most nurses had moderate post-traumatic stress symptoms before EMDR intervention. After EMDR intervention, the majority had mild post-traumatic stress symptoms. On the contrary, Kopmeiners et al. [33] demonstrated in their study that the difference in decline in the PCL-5 score was smaller over time.

Regarding correlates and predictors of emergency nurses demographic and work characteristics, the current study results demonstrated that nurses' age was significantly and negatively correlated with their depression symptoms and pos-traumatic stress symptoms (especially negative alteration in cognition and mood, and intrusive symptoms) scores. The possible explanation is that younger nurses usually occupy junior- to intermediate-level jobs that require more duties, resulting in exhaustion. In addition, the younger nurses lack the necessary experience to obtain the best outcome for patients due to fewer contacts with patients. As a result, there were increased levels of depression and post-traumatic stress symptoms.

Consistent results were revealed in a study done in Menoufia, Egypt, by El-Nager and El-Amrosy^[34], who mentioned that all participants' age and depression symptoms score were significantly and negatively correlated together. Likely, the finding matches a previous study by Akova et al.^[35] in Turkey, which pointed out that being in the age group of 30 and over was

associated with low depression in health care workers ($P < .001$), and young age was reported as a factor that causes depression.

In line with the rationale of the researchers, the current study results detect that the emergency nurses' depression symptoms and post-traumatic stress symptoms (especially negative alteration in cognition and mood, and hyperarousal symptoms) scores were negatively correlated with their experience. In confirmation of this, the regression analysis results of the present study verified that a negative predictor of nurses' depression symptoms was their experience in the emergency department.

These findings are similar to a Chinese study by **Zhou et al.** ^[36], which detected that the significant predictor of depression included frontline working experience in healthcare workers. Conversely, these results are incongruous with the **Teo et al.** ^[37] study, which assured that the presence of prior experience did not influence the depression score among the healthcare workers in Singapore.

The results of the present study also disclosed that the emergency nurses' depression symptoms score was significantly and negatively correlated with their unmarried status. The rationale for this result might be that unmarried nurses might receive less family support when faced with life stress, and thus they reported higher depression. This finding was also confirmed by the negative correlation between emergency nurses' depression symptoms score and their number of children. These findings agree with the **Cemal** ^[38] study in Lithuania, which found depression was higher among nurses who were unmarried.

Moreover, the current study results highlighted that the depression symptoms score had a statistically significant positive correlation with educational qualification. This might be because highly educated nurses were confronted with a complex psychological conflict between their unmet expectations regarding their professional growth and their heavy responsibilities as highly educated nurses. Similar results were reported in a study in Kenya by **Kariuki** ^[39], which disclosed a negative correlation between the risk of depression symptoms in nurses and their higher educational level.

The current study results also detected that the nurses' depression symptoms and intrusive symptoms scores were negatively correlated with their rotating shift. The possible reason is that rotating shifts would seem to inevitably cause disrupted circadian rhythms. This, in turn, affects nurses' social participation, family relations, and engagement in activities. Similarly, a study in China by **Lu et al.** ^[40] pointed out that the depression in rotating-shift medical staff was significantly higher than in day-shift staff.

In terms of the correlation between nurses' depression symptoms and post-traumatic stress clusters' scores, the present study findings disclosed that the depression symptoms score was significantly and positively correlated with the scores of intrusive symptoms, hyperarousal symptoms, avoidance symptoms, and negative alteration in cognition and mood scores. Correspondingly, a study by **Mathew et al.** ^[41] in the USA portrayed that there were significant positive correlations between the depression score and the PCL-5 symptom clusters.

Conclusions

In conclusion, the results of the present study summarized that the emergency nurses had higher scores in depression and post-traumatic stress symptoms before implementing the EMDR technique. After implementing the EMDR technique, significant improvements in depression and post-traumatic stress symptoms levels and mean scores among emergency nurses were detected. So, it proved the eye movement desensitization and reprocessing technique's efficacy in reducing depression and post-traumatic stress symptoms among emergency nurses.

Limitations:

There were a few limitations to this study. Firstly, the researchers were unable to find an EMDR device (set). Secondly, the sample size was small. So, it could not be representative of the population.

Abbreviations:

(EMDR): Eye Movement Desensitization and Reprocessing; (BDI-II): Beck Depression Inventory-Second Edition; (PTSD): Post-Traumatic Stress Disorder; (PTSS): Post-Traumatic Stress Symptoms; (BLS): Bilateral Stimulation; (DSM-5): Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; (SUD): Subjective Units of Distress; (VOC): Validity of Positive Cognition.

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