



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

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Abstract

Background: Emergency nurses face many stress factors at the same time, which can cause physical and mental fatigue in these nurses. The eye movement desensitization and reprocessing (EMDR) technique is a valuable psychotherapy approach to stem the psychological and emotional consequences of these stress factors. The aim of this study was to evaluate the effect of eye movement desensitization and reprocessing technique on anxiety 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 Anxiety Inventory (BAI), 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 anxiety as well as post-traumatic stress symptoms after implementation of the EMDR technique compared with before implementation of the EMDR technique.

Conclusions: Eye movement desensitization and reprocessing technique was effective in reducing anxiety and post-traumatic stress symptoms among emergency nurses. Therefore, it is recommended that emergency nurses use the EMDR technique as a non-pharmacological method for decreasing anxiety and post-traumatic stress symptoms.

Key words: Anxiety symptoms, Emergency nurses, EMDR, Post-traumatic stress symptoms

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Introduction:

The emergency department (ED) is a crucial component of the healthcare delivery system. The primary challenge of ED services is to maintain the level of quality despite the large volume of patient admissions presenting in the ED at any point of the day^[1]. Emergency nurses often work in difficult circumstances which can cause

stress including physical, and psychological and social features of their work settings. Physical factors include noisy and poor temperature level. Psychological risks include heavy workloads, unstable work environments and inequity between work and individual life. Social factors include a lack of social support from nursing co-workers^[2].

Anxiety is the sixth leading cause of disability worldwide. An estimated 301 million people suffer from anxiety disorders worldwide. That's around 4% of the global population [3]. The term "anxiety" refers to a pathological condition that characterized by a sense of apprehension, uncertainty, fear and alertness, with anticipation of negative events towards which the person feels hopeless and helpless. Anxiety can be conceptualized as an exaggerated pattern of fearful responding that has a negative impact on the individual's life [4].

Life experiences play an important role in the development of anxiety. These life experiences can originate from individual and professional life. In particular, nurses are at risk for anxiety disorders. This is because nurses often have to make crucial decisions for critical patients in emergency situations. Moreover, they are accountable to conscientious and ethical norms. All these factors contribute to increase their anxiety affecting their nurse-patient and nurse-colleague relationships. Thus, the ability of nurses to accept their profession is decreased [5].

Post-traumatic stress symptoms (PTSS) are a psychological response to an event where a person experiences actual or perceived threat to life or bodily harm coupled with intense anxiety. Symptoms include re-experiencing the event via nightmares or flashbacks, avoiding the triggers of traumatic memories, negative alterations in mood and thinking, and autonomic nervous system hyper arousal. During and immediately after a traumatic medical event, an acute stress response can occur and resolves for most people without intervention. This acute stress response becomes chronic PTS when lasting greater than 1 month can go unabated for the person's lifetime [6].

Post-traumatic stress disorder (PTSD) is approximately 3.9% of the population worldwide [7]. The PTSD among emergency nurses have been widely increased in recent years due to their indirect or direct exposure to traumatic situations while providing care

to vulnerable patient populations. Emergency nurses also directly experience trauma from workplace violence which negatively influences nurses' physical and mental well-being making the nurses at risk for the development of PTSD; however, not every nurse who experiences a traumatic event develops PTSD [8].

Eye Movement Desensitization and Reprocessing (EMDR) is a psychotherapeutic method that works as a brain-constraining mechanism to deal with ongoing unprocessed psychological disturbance caused by traumatic memories by asking the individual to recall trauma-related memories while side-to-side eye movements are induced [9]. EMDR technique is based on the adaptive information processing (AIP) model. In EMDR Therapy it is presumed that the neurophysiological activity of the AIP system in the brain leads to a reduction in negative emotions and neurophysiological activity that can be encoded as a result of upsetting experiences, leading to integration of upsetting information into a more adaptive, positive state [10].

Eye Movement Desensitization and Reprocessing (EMDR) therapy may present a valuable psychotherapy approach to stem the psychological and emotional consequences of these cumulative events experienced by healthcare workers (being confronted with many deaths and dying patients, having to perform repeated intrusive medical acts, announcing deaths to loved ones, etc.) [11]. Numerous researches have confirmed that EMDR therapy significantly reduces the symptoms of post-traumatic stress disorder, depression, and anxiety [12].

Aim:

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

Subjects and methods

Research Hypotheses:

1. The eye movement desensitization and reprocessing technique will decrease anxiety symptoms among emergency nurses.
2. The eye movement desensitization and reprocessing technique will decrease post-traumatic stress symptoms among emergency nurses.

Design: A quasi-experimental was used in this study.

Subjects:

A purposive sample composed of 75 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. Both sexes.
2. Accept to participate in the study.
3. Work in the previously mentioned settings for more than one month.

Exclusion criteria:

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

Sample size:

Subjects of this study include all emergency nurses working in the previous settings during the study who met the inclusion criteria (N = 75) (**Figure 1**).

Sampling technique:

The study subjects were selected based on purposive sampling technique according to specific criteria (**Figure 1**).

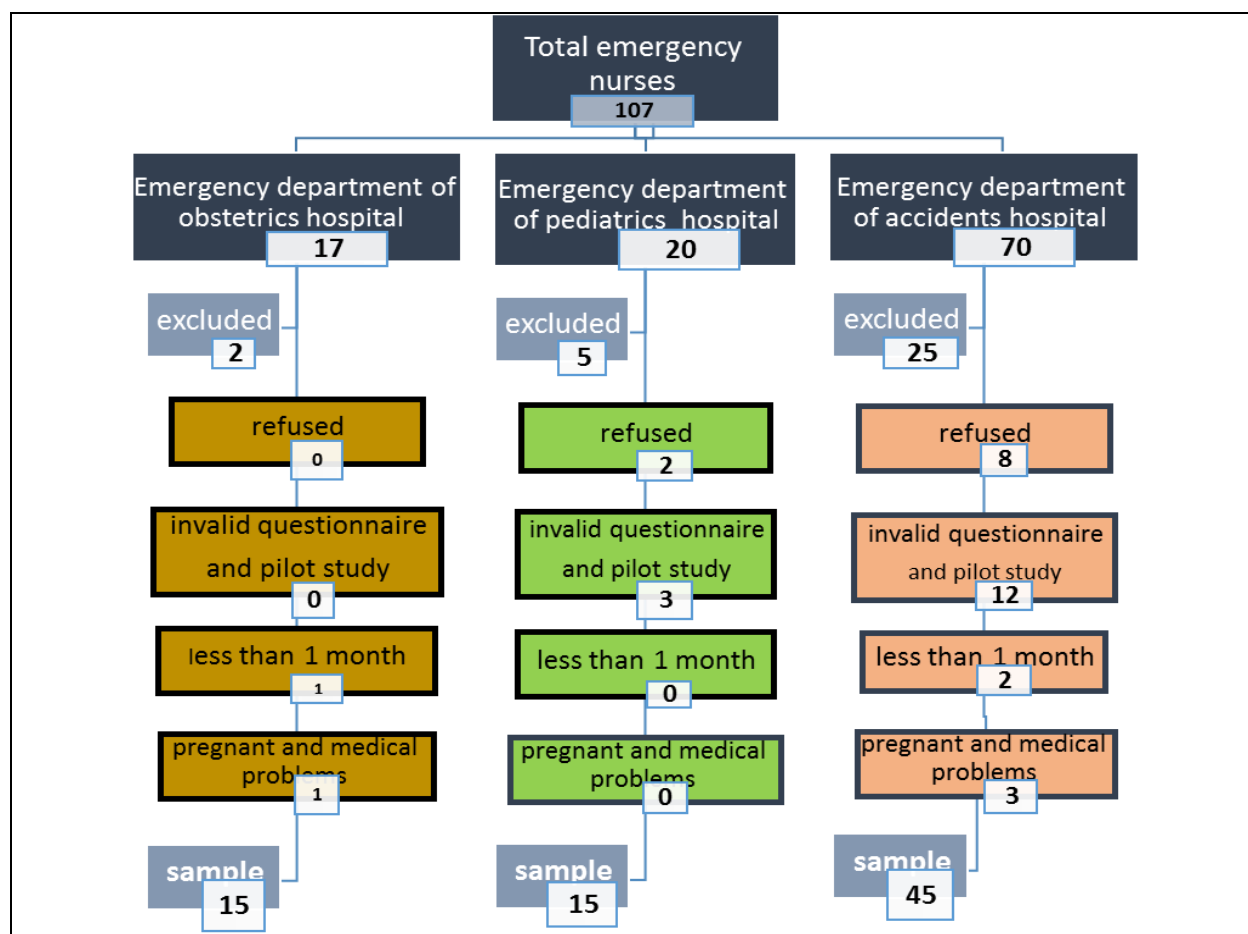


Figure 1: Sampling technique (Designed by Researchers).

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: Demographic data sheet:

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

Part two: Work data sheet:

This sheet was used to assess the work characteristics of the studied emergency nurses, such as working shift, working hour per week, experience in the nursing

profession, and experience in the emergency department.

Tool (II): Beck Anxiety Inventory (BAI):

This tool was prepared by **Beck & Steer** [16] to assess anxiety symptoms' existence and severity over the past one week. The BAI consists of 21 items that assess subjective, neurophysiologic, autonomic and panic-related symptoms of anxiety.

Scoring system:

A 4-point Likert scale from 0 to 3 was utilized to rate all items. The level of anxiety can be evaluated as follows: 0–7 is considered minimal, 8–15 is mild, 16–25 is moderate, and 26–63 is severe anxiety 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. A PCL-5 cut-point of 31 appears to be a reasonable value to use for having clinically significant post-traumatic stress symptoms or meeting criteria for PTSD (probable PTSD) and the participant needs further assessment to confirm a diagnosis of PTSD. Scores lower than 31 may indicate the participant either has subthreshold post-traumatic stress symptoms or does not meet criteria for 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. Cronbach alpha coefficients were calculated to assess the instruments' internal consistency (reliability), as demonstrated in the table:

Anxiety inventory	0.875
PTSD checklist	0.779

Ethics approval

The Committee of Research Ethics at Zagazig University's Faculty of Nursing approved the study protocol (M.D.ZU.NURI92115/2/2022). 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.

Pilot study:

A pilot study included eight emergency nurses from the study setting, forming about 10% of the calculated sample. They were later excluded from the study sample. The goal was to evaluate the tools' viability and clarity while also determining how long it would take to complete the data gathering forms.

Fieldwork:

The nurses were interviewed by the researchers who introduced herself and explained the aim of the study and the technique briefly seeking their written agreement in the study and reassured them that information obtained is strictly confidential and would not be used for any purposes other than research. The researchers read and explained each item of the study data collection tools to the emergency nurses. The time consumed for filling the study tools ranged from 30 to 45 minutes.

The study was carried out over a six-month period. The process of data collection included four phases: The assessment phase took a month, while the planning and implementation phases took about four months. This period involved the provision of theoretical (4 sessions) and practical (9 sessions) content. At first, the researchers gave theoretical information (sessions from 1 to 4) about anxiety and post-traumatic stress disorders. Then, they began the practical part of the EMDR technique for each nurse (sessions from 5 to 13). After this period, the researchers evaluated the degree of improvement in emergency nurses through a post-test, which took about a month.

EMDR Interventions

During the reprocessing stages of 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 practical part of EMDR technique was carried out in eight stages in accordance with the EMDR standard technique:

- 1. The First Stage (History Taking):** The researchers developed a therapeutic rapport, and assessed the nurse's social, psychological, and physical stability prior to engaging in the procedure. The researchers also determined nurses' suitability for the EMDR procedure and developed a treatment plan. In addition to past events, current triggers and desired future reactions were assessed.
- 2. The Second Stage (Preparation):** The researchers prepared the nurses to handle any disturbances that may arise in EMDR processing. The researchers offered an explanation for the technique, tested the eye movements. The nurses were offered the option of a cued safe place exercise with bilateral stimulation. The chosen technique was practiced until the participant was comfortable with it and was able to reduce low-level distress using the technique.
- 3. The Third Stage (Assessment):** Once the memory or issue has been identified, the researchers asked the nurse to select the image that best represents it. The researchers then asked for a negative belief that is related to the experience, a positive belief to begin to stimulate a connection between the experience as it is currently held with the adaptive memory network(s) and the validity of the positive belief, utilizing the seven-point Validity of Cognition (VOC) scale. Finally, the researchers asked the nurse to name the emotions evoked when pairing the image and the negative belief, to rate the level of disturbance utilizing the 0 to 10 Subjective Units of Disturbance (SUD) scale and to identify the location of the physical sensations in the body that are stimulated when concentrating on the experience.
- 4. The Fourth Stage (Desensitization):** The nurses were asked to access the image, negative cognition, and physical sensations associated with the target memory in order to intensify the emotional response. He or she then engaged in the first set of 24 saccadic eye movements or auditory stimulations. After this set, the participant was instructed to "let it go" and "blank it out" and the researcher inquired about their experience. The nurses were directed to pay attention to any new emotional, cognitive or physical material that arose and to process this material in the next set. The length of the bilateral stimulation sets were modified based on the requirements of the participant. The researchers checked the SUDS rating. SUDS at zero indicated that the target memory has been fully reprocessed.
- 5. The Fifth Stage (Instillation):** Nurses were instructed by the researchers to access the target memory while maintaining positive cognition in mind and engaging in bilateral stimulation until it reached the maximum degree of acceptance on the VOC scale. The researchers didn't proceed to the body scan stage until the instillation stage was completed (VOC increased).
- 6. The Sixth Stage (Body Scan):** The nurses were usually asked to mentally examine their body and report any tension or unusual sensations during the

6th stage of EMDR. The nurses sensations were targeted with bilateral stimulation.

7. **The Seventh Stage (Closure):** The nurses were guided through their chosen relaxation exercise at the end of the session, and reminded that this procedure could be used to reduce distress in the future, if needed. The nurses were also assessed for other forms of distress which would impede immediate functioning.
8. **The Eighth Stage (Reevaluation)** occurred at the beginning of reprocessing sessions to assess the previous session's outcomes.

Stages 2 (present triggers) and 3 (future templates) of EMDR were processed once the trauma memory has been fully processed.

The evaluation of the effectiveness of the eye movement desensitization and reprocessing technique (posttest) was done after completion the technique by using the same pretest tools to evaluate the degree of improvement in nurses' anxiety and posttraumatic stress symptoms

Statistical Analysis:

Data entry and statistical analysis were done using SPSS 23.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations and medians for quantitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the developed scales through their internal consistency. Quantitative continuous data were compared using the non-parametric Mann-Whitney or Kruskal-Wallis tests and paired t test. Qualitative categorical variables were compared using friedman test. Whenever the expected values in one or more of the cells in a 2x2 tables was less than 5, Fisher exact test was used instead. Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables and ranked ones. In order to

identify the independent predictors of anxiety and PTSD, multiple linear regression analysis was used and analysis of variance for the full regression models was done. Statistical significance was considered at p-value <0.05.

Results:

Regarding the studied emergency nurses' demographic characteristics, **Table 1** demonstrates that the age of the studied emergency nurses ranged from 21 to 40 years with mean 26.17 ± 4.61 and the highest percentage of them aged from 21 to 30 years (84%). This table also summarizes that 56% of the studied emergency nurses were females. Considering marital status, 56% of the studied emergency nurses were unmarried and 61.3% of them had no children. Ultimately, the studied emergency nurses had equal percentage of sufficient and in sufficient monthly income (38.7%).

As related to work characteristics of the studied emergency nurses, **Table 1** also reveals that the highest percentage of the studied emergency nurses worked rotating shifts (57.3%) and worked less than 48 working hours/week (60%). The same table also shows that 60% of the studied emergency nurses had experience equal or less than five years in the nursing profession with mean of 4.77 ± 5.55 , also, 52% of nurses had experience less than two years in the emergency department with mean of 3.80 ± 4.76 .

Concerning educational qualifications of the studied emergency nurses, **Figure 2** illustrates that the emergency nurses with technical degree in nursing dominated the study. As evidence, the highest percentage of them had technical degree in nursing (57.3%), followed by bachelor degree in nursing (25.3%). Meanwhile, 10.7% of them had diploma degree in nursing and only 6.7% were postgraduate.

Table 2 clarifies that there was a highly statistically significant difference of the studied emergency nurses' total anxiety symptoms level pre-technique implementation compared with post-technique implementation ($p < 0.001$). Accurately, the percentage of studied emergency nurses who had moderate and severe levels of anxiety symptoms decreased from 44% and 30.7% respectively before the technique to 28% and 4% respectively after applying it. Whereas, the percentage of emergency nurses who had minimal and mild levels of anxiety symptoms increased from 0% and 25.3% respectively before the technique to 26.7% and 41.3% respectively after applying it.

Figure 3 illustrates a highly statistically significant difference in the anxiety symptoms' total mean score among the studied emergency nurses pre-post EMDR technique. Before the technique, total mean score was 24.15 ± 10.68 which decreased to 14.27 ± 7.06 post-technique with $p < 0.001$.

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.

Table 4 indicates that 74.7% of the total studied emergency nurses classified as having clinical post-traumatic stress symptoms (probable PTSD) at the pre-technique implementation, while at the post-technique implementation, a highly statistically significant improvement was revealed and this percentage decreased to only 6.7%. Reversely, there was 25.3% of the total nurses with subthreshold post-traumatic stress symptoms (partial PTSD) at the pre-technique implementation which increased to

93.3% at the post-technique implementation ($p < 0.001$).

Figure 4 depicts that there was a highly statistically significant reduction in the mean score of emergency nurses' total posttraumatic stress symptoms from 37.01 ± 8.62 pre-technique to 23.51 ± 5.78 post-technique with $p < 0.001$.

The results in **Table 5** indicated a highly statistically significant positive correlation between anxiety symptoms score from one side and each of total post-traumatic stress symptoms score ($r = .641$), intrusive symptoms ($r = .316$), negative alteration in cognition and mood ($r = .526$), and hyper arousal symptoms ($r = .458$).

Also, as obvious from **the same table**, there were a highly statistically significant positive correlation between the score of total post-traumatic stress symptoms and each of the score of intrusive symptoms ($r = .637$), avoidance symptoms ($r = .509$), negative alteration in cognition and mood ($r = .643$), and hyper arousal symptoms ($r = .550$). As well, a statistically significant positive correlation was revealed between the score of intrusive symptoms and the score of avoidance symptoms ($r = .276$). Also, a statistically significant positive correlation was demonstrated between the score of negative alteration in cognition and mood, and the score of hyper arousal symptoms ($r = .277$).

Table 6 discloses that there was statistically significant positive correlation between anxiety symptoms score and educational qualifications ($r = .285$). On the other hand, there were a highly significant negative correlation between anxiety symptoms score and each of age ($r = -.488$), number of children ($r = -.503$), experience in nursing profession ($r = -.434$), and experience in emergency department ($r = -.513$).

Moreover, **Table 6** signifies that post-traumatic stress symptoms score had a highly statistically significant negative

correlations with each of age ($r=-.417$), number of children ($r=-.394$), working shifts ($r=-.240$), experience in nursing profession ($r=-.369$), and experience in emergency department ($r=-.442$). Conversely, a statistically significant positive correlation was demonstrated between post-traumatic stress symptoms score and working hours ($r=.231$).

As evident from **Table 7**, the intervention significantly improved anxiety symptoms score. As well, the experience in emergency department was statistically significant independent negative predictor of anxiety symptoms score. This means that the anxiety symptoms score decreased with increasing experience in emergency department. Other emergency nurses`

characteristics had no significant independent influence on the anxiety symptoms score. The model explains 32% of variations in anxiety symptoms score as shown by the value of r-square.

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. The other emergency nurses` characteristics had no significant independent effect on 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
Demographic characteristics		
Age group /year		
21- 30	63	84.0
31- 40	12	16.0
Mean ± SD (Range)	26.17 ± 4.61 (21 – 40)	
Gender:		
Male	33	44.0
Female	42	56.0
Marital status:		
Married	33	44.0
Unmarried [Single- Widower/ divorced]	42	56.0
No. of children:		
No children	46	61.3
≤ 2	20	26.7
> 2	9	12.0
Monthly income:		
Insufficient	29	38.7
Sufficient	29	38.7
Saving	17	22.6

Work characteristics		
Working shifts:		
Day	9	12.0
Night	23	30.7
Rotating	43	57.3
Working hours/ week:		
< 48 hours	45	60.0
≥ 48 hours	30	40.0
Experience in nursing profession:		
≤ 5 years	45	60.0
6- 10 years	19	25.3
> 10 years	11	14.7
Mean ± SD (Range)	4.77 ± 5.55 (2 months – 20 years)	
Experience in emergency department:		
< 2 years	39	52.0
2- 5 years	19	25.3
> 5 years	17	22.7
Mean ± SD (Range)	3.80 ± 4.76 (2 months – 20 years)	

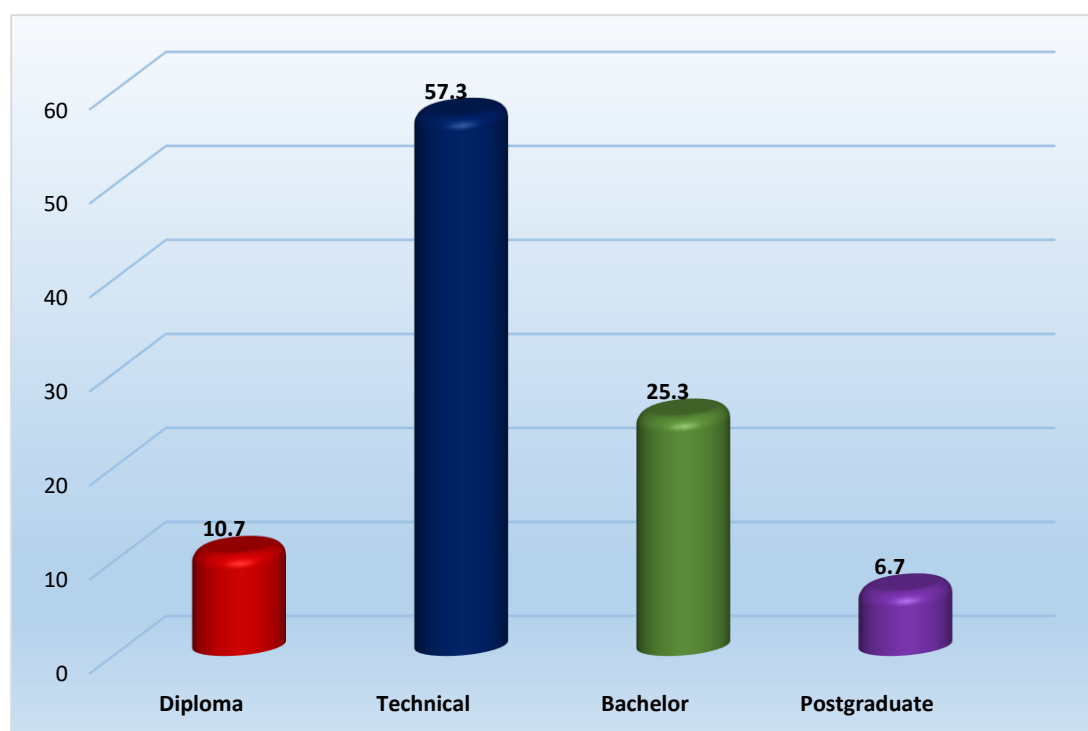


Figure (2): Educational qualifications of the studied emergency nurses (N=75)

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

Anxiety symptoms level	Pre (n=75)		Post (n=75)		Friedman test	(p-value)
	No	%	No	%		
Minimal anxiety	0	0.0	20	26.7	68.00	< 0.001**
Mild anxiety	19	25.3	31	41.3		
Moderate anxiety	33	44.0	21	28.0		
Severe anxiety	23	30.7	3	4.0		

***: Highly significant*

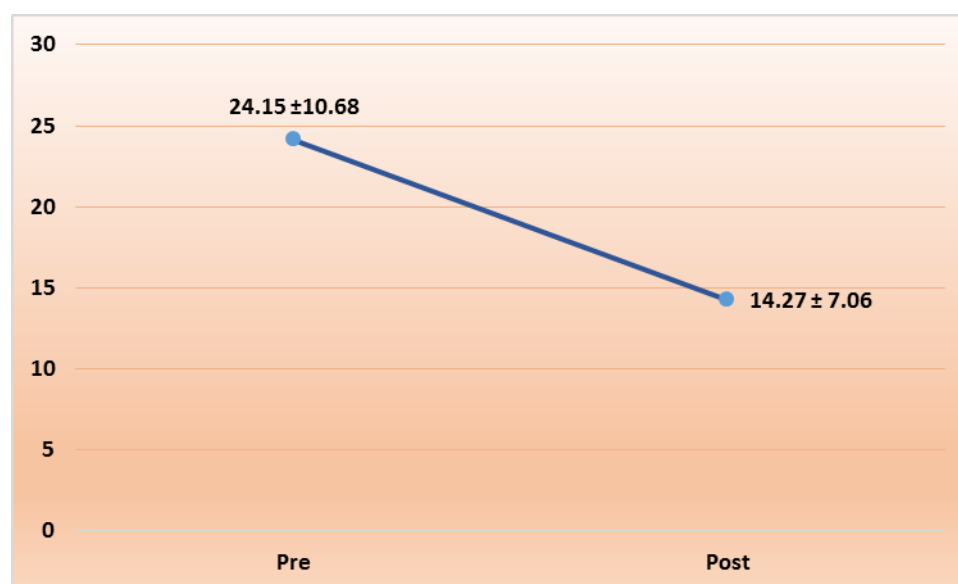


Figure 3: Anxiety symptoms' total mean score among the studied emergency nurses pre–post EMDR technique (N=75)

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	

** : Highly significant

Table 4: Post-traumatic stress symptoms' total level among the studied emergency nurses pre-post EMDR technique (N=75)

Posttraumatic stress symptoms level (cut off 31)	Pre (n=75)		Post (n=75)		McNemar test	(p-value)
	No	%	No	%		
Subthreshold symptoms (Partial PTSD) 0-30	19	25.3	70	93.3	49.02	< 0.001**
Clinical symptoms (Probable PTSD) 31 - 80	56	74.7	5	6.7		

** : Highly significant

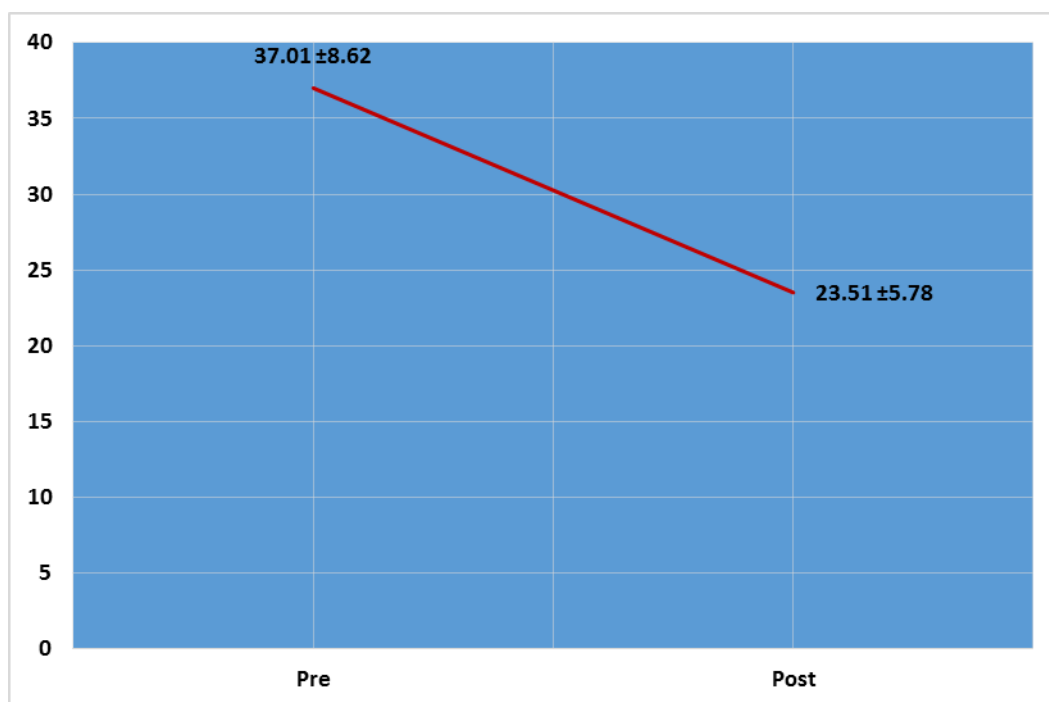


Figure 4: Post-traumatic stress symptoms' total mean score among the studied emergency nurses pre–post EMDR technique (N=75)

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

	Anxiety symptoms	Total post-traumatic stress symptoms	Intrusive symptoms	Avoidance symptoms	Negative alteration in cognition and mood	Hyper arousal symptoms
Anxiety symptoms						
Total post-traumatic stress symptoms	.641**					
Intrusive symptoms	.316**	.637**				
Avoidance symptoms	.206	.509**	.276*			
Negative alteration in cognition and mood	.526**	.643**	.175	.120		
Hyper arousal symptoms	.458**	.550**	.090	.073	.277*	

R: Pearson's correlation coefficient (*) statistically significant at $p < 0.05$ (**) statistically significant at $p < 0.01$

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

	Anxiety symptoms	Post-traumatic stress symptoms
Age	-.488**	-.417**
Educational qualifications	.285*	.177
Working shifts (rotating)	-.128	-.240*
Working hours/week.	.171	.231*
Experience in nursing profession	-.434**	-.369**
Experience in emergency department	-.513**	-.442**

R: Pearson's correlation coefficient (*) Statistically significant at $p < 0.05$ (**) statistically significant at $p < 0.01$

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

Characteristics	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	17.588	3.436		5.119	.000	10.735	24.441
Intervention	7.20	1.34	.29	5.357	.000	4.55	9.86
Age	-.604	2.785	-.032	-.217	.829	-6.158	4.950
Children no.	-2.461	1.426	-.246	- 1.726	.089	-5.305	.383
Educational qualifications	1.487	.944	.157	1.575	.120	-.396	3.369
Experience in emergency department	-2.791	1.242	-.324	- 2.247	.028	-5.269	-.313
R-square=0.32 Model ANOVA: F=9.50 p<0.05							

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
Working shifts	-.165	1.488	-.020	-.111	.912	-3.133	2.803
Working hours/week	.189	.176	.193	1.071	.288	-.163	.540
Experience in nursing profession	.529	1.410	.068	.375	.709	-2.284	3.341
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

Eye movement desensitization and reprocessing (EMDR) technique is innovative treatment modality for several mental health issues. EMDR technique leads to symptom reductions not only in case of post traumatic-stress disorder but also in anxiety, depression, and sleep disorders. EMDR technique aims to integrate maladaptive information into a functional memory network by focusing on stressful memory and bilateral stimulation [18]. This study aimed to evaluate the effect of eye movement desensitization and reprocessing technique on anxiety and post-traumatic stress symptoms among emergency nurses.

The current study firstly hypothesized that "anxiety symptoms among emergency nurses would be decreased after implementation of eye movement desensitization and reprocessing technique". Accurately, before implementing the EMDR technique, the results revealed that the highest percentage of the studied emergency nurses had anxiety symptoms ranging from moderate to severe levels with increased its total mean score. This might be related to that the emergency department is on the front line of hospital services which exposes nurses to unpredictable situations such as life-threatening emergencies and rapid medical intervention. The day-to-day exposure to these situations creates a high level of anxiety symptoms.

The current study outcome is consistent with three previous studied in Turkey. The first study by **Büyükbayram & Aksoy** [19] determined that the nurses had moderate levels of anxiety with increased their mean score. The second study by **Altınbilek et al.** [20] observed that emergency nurses had higher beck anxiety inventory score than other staff. The third study by **Şahin & Kulakaç** [21] indicated

that the anxiety scores of emergency room nurses were found to be significantly higher.

On the other hand, after implementing EMDR technique, the current study results revealed a highly statistically significant improvements in anxiety symptoms' total mean score and levels among the studied emergency nurses as the percentage of nurses who had moderate and sever anxiety symptoms decreased and the percentage of nurses who had mild anxiety symptoms increased indicating that the first hypothesis was largely realized and accepted. This might be because EMDR technique works by directing nurses' eye movements while imagining anxious situation and shifting the attention toward more positive thoughts. In doing so, anxious situation is reframed positively and accordingly, the body's stored negative emotional charges are released.

These results coincided with two recent studies in Menoufia, Egypt. The first study performed by **El-Abbassy et al.** [22], to examine the effect of EMDR technique on anxiety, depression, sleep quality among emergency nurses, determined a highly significant lowering of post-EMDR application mean anxiety score than in pre-EMDR application in emergency nurses. The second study by **El-Nagar et al.** [23], to examine the efficiency of eye EMDR technique on public speaking anxiety and self-esteem, revealed that there was a significant improvement in the anxiety levels as the moderate to high levels decreased after EMDR technique.

On the same way, a study done in Iran by **Ghanavatpour et al.** [24] showed that the majority of the group had moderate to high anxiety before the eye movement and reprocessing interventions. While, immediately after interventions, the minority of the group had moderate to high anxiety. In contrast with these results, a study in Turkey by **Yasar et al.** [25] emphasized that

there was no significant change in anxiety symptoms levels between baseline and after eye movement interventions.

The intriguing findings that shed light on the outstanding effect of the EMDR technique in achieving **the second hypothesis** were comparing post-traumatic stress symptoms' mean scores and levels pre- and post-EMDR technique implementation. As revealed in the present study findings, before implementing the EMDR technique, the mean scores of all post-traumatic stress symptoms' clusters were increased. As well, the the majority of nurses had clinical post-traumatic stress symptoms (probable PTSD).

Whereas, after implementing the EMDR technique, the post-traumatic stress symptoms' mean scores and levels significantly improved, as the minority of nurses had clinical post-traumatic stress symptoms (probable PTSD) because, during EMDR sessions, the bilateral stimulation inhibits the activation of the amygdala and moves the memory from the amygdala in to the brain cortex that allows the traumatic conditions to be processed, emerging in a more adaptive shape, and subsequently eliminating post-traumatic stress symptoms.

This goes online with the **Goga et al.** [26] study in Romania, which showed a significant difference after EMDR therapy in scores of PTSD symptoms for the pre-test condition and post-test. Likely, the **Faretta et al.** [27] study in Italy discovered a significant decrease in scores of PTSD symptoms post-EMDR treatment. Also, the **Conijn et al.** [28] study in the Netherlands demonstrated that EMDR resulted in a significant reduction in all subscale scores of PCL-5 at pre- and post-interventions. Moreover, the **Susanty et al.** [29] study in Indonesia clarified that before EMDR therapy, the mean scores for PTSD clusters declined after application of EMDR.

These current study results are incongruous with those of **Meentken et al.**

[30] in the Netherlands; their results revealed that eye movement desensitization and reprocessing interventions were not significantly superior in reducing participants' reported total post-traumatic stress disorder symptoms score. The same was true for all four PTSD subscales. On the contrary, **Kopmeiners et al.** [31] demonstrated in their study in the Netherlands that the difference in decline in the PCL-5 score was smaller over time. No statistically significant results were found due to the limited sample size.

Regarding correlates and predictors of emergency nurses demographic and work characteristics, the present study findings disclosed that nurses' age was significantly and negatively correlated with their anxiety symptoms and post-traumatic stress symptoms scores, which might be because that younger nurses lack the necessary experience and clinical skills they need to deal with critically ill patients and emergent situations in emergency department. As a result, they cannot tolerate circumstances that cause trauma.

These results are like those of **Khazaei et al.** [32] in Iran which showed that age was negatively correlated with PCL-5 score, and emergency technicians with the age of ≤ 30 years could predict PTSD symptoms. In the same vein, a study of **Alzahrani et al.** [33] in Saudi Arabia indicated that age was negatively correlated with anxiety symptoms. In contrast, a study conducted by **Moreira et al.** [34] in Portugal assured that there was no significant difference between anxiety symptoms score and age.

The current study results detects that the emergency nurses' anxiety and post-traumatic stress symptoms scores was negatively correlated with their experience. Where, the less experienced nurses had an increased post-traumatic stress. In confirmation of this, the present study results also assured that experience in emergency department was an independent

negative predictor of post-traumatic stress symptoms score. Possible explanation is that less experienced nurses are not equipped with skills and expertise for handling emergencies and adjusting to the new work environment. So, less experienced nurses do feel stress during their practice.

This finding comes in line with a study by Narendra **Narendra Kumar et al.** ^[35] in Malaysia which illustrated that shorter duration of service as a health care worker in emergency department was significantly associated with more psychological symptoms. Correspondingly, **Xiao et al.** ^[36] detected in their study in china that the post-traumatic stress disorder risk was increased by decreased years of experience. This result is discountenance with a study done in China by **Ren et al.** ^[37] who mentioned that the symptoms of anxiety was increased with increasing years registered as a nurse.

Further, the current study results revealed that the anxiety symptoms score had a highly statistically significant positive correlation with educational qualification. This might be because they confronted with a complex psychological conflict between their unmet highly expectations regarding their professional growth and their heavy responsibilities as a highly educated nurses to provide the best clinical practices which leads to anxiety symptoms. These results are consistent with **Zhao et al.** ^[38] study in China clarified that nurses' anxiety was positively correlated to their education level.

The findings of this study emphasized that nurses' post-traumatic stress symptoms score was positively correlated with their working hours and negatively correlated with their rotating shifts. This might be because working for longer hours presents a longer time for exposure to work-related trauma. This result is like a study in Iran by **Sheikhbardsiri et al.** ^[39] who discovered a significant correlation between overtime hours and work related post-traumatic stress.

As revealed in the present study findings, there were a highly statistically significant positive correlation between anxiety and post-traumatic stress symptoms scores. This meant that those who experience higher levels of anxiety symptoms experience also higher levels of post-traumatic stress symptoms. This finding is in alignment with **Guttormson et al.** ^[40] in United States who noted in their study that anxiety and post-traumatic stress disorder scores were significantly and positively correlated.

Conclusions

In view of the study findings, it could be concluded that the eye movement desensitization and reprocessing technique was effective in decreasing anxiety and post-traumatic stress symptoms among emergency nurses. As well, anxiety and post-traumatic stress symptoms among emergency nurses were positively correlated. Furthermore, the nurses' experience in emergency department was an independent negative predictor of anxiety and post-traumatic stress symptoms.

Limitations:

There were a few limitations to this study. Firstly, this research was carried out in emergency departments located in one city; therefore, the results cannot be generalized to all emergency nurses. Secondly, the probability of inaccuracy in answering questions due to time constraints in the emergency department.

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