



## The Capacity of emotional visual and verbal working memory in cancer patients with PTSD

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### Abstract:-

**Introduction:** Given that memory is one of the significant factors to perform everyday tasks, and any defect in it curbs the appropriate function and performance of an individual in his life; so that in order to emphasize the significance of memory and access to the details of this factor, the study in hand exhibits a comparison between patient group and control group in terms of verbal working memory and visual emotional one.

**Methods:** The evaluation of these two memories has been carried out by two visual emotional and verbal emotional tasks. In visual tasks, a picture of a woman's face is used. In this task, first the picture of the woman was being exposed and then emotional, unemotional, and neutral pictures were being presented. And then the pictures of the woman which were shown before reappeared. Finally, the subjects were asked to recognize the changes in pictures with yes or no answers, and if the answer was yes, they had to identify the picture that had been changed. The verbal memory task was in a way that a sentence with a word was displayed for the patient, so that the patient had to both memorize the word and respond whether it is true or false by yes or no. After five word-sentence pairs, the individual had to remember the order of the memorized words. Individuals could get the full score if they remembered the true order of the words, and if they couldn't fully remember, the proportion of the recalled words were calculated. In the current study, the participants were breast cancer patients.

**Results and Discussion:** Based on statistical analysis, research hypotheses were evaluated, so that significant differences were found between study groups in verbal emotional memory. But concerning visual emotional memory, no significant difference was found between the controls and the group without PTSD. The process of change in both types of memory was in such a way that the group with PTSD had the lowest level and there were no significant differences between the control group and the group without PTSD concerning visual emotional memory capacity.

**Conclusion:** From four existing hypothesis three hypothesis were confirmed but one was not confirmed.

**Keywords:** PTSD, emotional verbal and visual working memory, The task of emotional verbal and visual working memory

### I. INTRODUCTION

These days, there is an increasing trend in human societies in terms of population and urbanization is developing, humans must tolerate daily pressures and tension in their lives. Most people typically have enough readiness to deal with these pressures, or at least have a sort of knowledge to mitigate them. But sometimes these tensions force humans to bear heavy pressures that are beyond their tolerance. In this situation, the pressures are not as a stressor, but they can be interpreted as a traumatic strike. For example, it can be noted that the experience of natural events such as floods, earthquakes, storms, interpersonal injuries such as sexual abuse, physical and family violence and sudden injuries due to events such as accident and loss of loved ones and serious illnesses without definitive treatment, such as cancer, all are examples of traumatic strikes. These strikes and experiences involving the risk of real death or destruction and frustration are horrific, and if the reaction of people to the traumatic events, is chronic and debilitating, we can say they have post-traumatic stress disorder. In this status, their response is not natural. The impact of these events is not limited to the area, time, and particular individuals, but includes all groups and members of the community. The traumatic events do not have a specific boundary and are not being distinguished between men and women. For more than a century, the emergence of psychological helplessness as a result of the experience of a traumatic event is discussed and studied. For thousands of years, psychological trauma has been a source of panic and fear for people. Statistics indicate that the

costliest health-related problem in recent years after cardiovascular disease has been disorders related to psychological trauma and it is the fourth most common psychiatric disorder in the United States that its rates in the public population after alcoholism, major depression and social phobia is the highest. The cognitive approach focuses on the existence of different ways for information representation in the mind that their role in developing emotional disorders is both a infrastructural element and a distinctive factor. We can detect these factors with comparing cognitive abilities in Groups with emotional disorders. One of the important capabilities in performing cognitive assignments is the capacity of working memory that includes the individual's mental capacity to store and manipulate some of the information. On the other hand, mutual connection between cognition and emotion is the scholars' favorite topic. At present, a great deal of research and studies have been devoted to this relationship and the reciprocal impact of various emotions and cognitive sub-collections. Along with this research path, due to the emotion involved in most mental disorders, the importance of considering the cognitive aspects of this range of disorders that is the same as emotional working memory in post traumatic stress disorder, is more and more undeniable which has been used from breast cancer patients because of involving memory .Cancer is a type of illness that has profound psychological effects. Cancer is usually due to functional impairment of growth regulatory mechanisms and cell division. This functional impairment results from the creation of genetic injuries, often caused by chemicals, hormones, and sometimes by viruses. Thus, the cancer occurs when the mechanisms responsible for stabilizing the growth process of the cells become obstructed. The concept of death becomes a source of fear and anxiety, and in the face of cancer, the patient passes through several different psychological stages. In this study, patients with PTSD due to Breast Cancer and control group have been studied. In the present research, there are four hypotheses: the success rate in the task of emotional visual working memory capacity in cancer patients without Post traumatic stress disorder is more than cancer patients with posttraumatic stress disorder. Additionally, the success rate of emotional work memory capacity in the control group (healthy subjects) is higher than other research groups. Also, the ratio of the words reminded to restore emotional verbal information in cancer patients without posttraumatic stress disorder is more than that of patients with posttraumatic stress disorder, and in the end, the proportion of words reminded to restore emotional verbal information in the control group (healthy subjects) is higher than the other groups.

## II. METHOD

In this study, patients with breast cancer were present. After a clinical interview with 70 of them, 40 subjects who had the criteria of the study were selected, half of them complied with criteria for posttraumatic stress disorder, and the other half did not have disorder criteria. In addition to these two groups, 20 healthy subjects were also included as control group in the study. They were subjected to memory tests. In this study, a diagnostic clinical interview was performed based on DSM V so that such questions in the following sections were included:

Symptoms of molestation (for example, molesting memories, painful dreams, dissociation reactions or flashbacks, severe distress, physiological responses to triggers); persistent avoidance of memories, thoughts or feelings associated with a traumatic event, or avoiding external Reminders (for example, some people, some places); permanent, negative changes and distortions in cognitive and mood (eg affective anesthesia, cognitive distortions, delusions); severe vigilance or increased arousal (for example aggression, anger explosions, problems, Sleep problems, problems with distraction, carelessly or self-destructive behaviors).In addition to the above interviews, instruments such as Impact Of Event Scale - Revised (IES-R), the task of verbal and visual working memory, Beck Anxiety and Depression Inventory were also used that each of them will be explained briefly so that the data of them were analyzed through variance analysis of multivariate (Table 1) and Tukey's post hoc test (Table 2).

Impact of Event Scale -Revised is a Likert questionnaire and includes a list of problems that people experience after stressful events in their lives. The total score of 22 items constitutes the total score of the test. In addition, each subscale is scored according to the total score of its constituent sub-scales. Thus, the score of avoidance subscale includes the sum of scores of materials 5,7,8,11,12,13,17, 22, the unwanted thought subscale, including the total score of materials 1,2,3,6,9,16,20 and the score of the hyperactivity subscale, including the total score of 4,10,14,15,18,19,21. The total score of IES-R is the sum of the three subscales mentioned above. In this study, we made use of the task composition which is used by Murray et al. And Wong, Patterson and Thompson to measure the working memory capacity. This assignment is computer-based and consists of two parts. The first part comprises three steps. The first step is encoding,

which has three status (2,3,4 images) of the face, and the second is the delay, which includes traumatic, neutral, and devoid of content, and the third is retrieval step. In 50% of cases, the content of the images is changed, but the position of the images will not change. Totally, this section will take 29 seconds. The second part will include cases in which the participant gives a "yes" response to the change in image content, in which case the person must move the cursor over the image and indicate the modified one by clicking on it.

This assignment was made in the Iranian society and in line with Iran's culture by MiraboAlFathi for patients with PTSD due to accident, in which women's faces from 20 to 40 years of age were used. First, from the total of 500 photos of faces, 315 photographs were selected and the criteria for choosing the photos were similar clarity and the same direction for the face in each image. The selected photographs were changed to 188 \* 260 using the Photoshop software. Also, the background of the photos were quite dark. To evaluate the capacity of emotional verbal working memory, the Dalglish and Schuizer task were used. The research was carried out by the researcher in accordance with Iranian culture and with changes in the task. This task was performed on a computer basis so that the participants in addition to memorizing the words along with the sentences, had to identify correctness or incorrectness for the sentences both grammatically and structurally. Given that one hundred sentences, half of which had emotional load and the other half had neutral load, were required, firstly to collect 50 sentences of emotional load from Impact of Event Scale -Revised (IES-R) (20 sentences) and the post-traumatic cognitions questionnaire (30 sentences) were used, and 50 other sentences with neutral load were used the general information storage. The ordering of the presentation of these sentences was initially with neutral sentences and then with emotional sentences. These sentences were presented randomly. The presented sentences were provided by the 10 volunteers who participated voluntarily, with a five-level Likert scale from easy to hard grading so that Were arranged for participants in the same order. It should be noted that the length of the sentences was 10 to 13 words. The sentences were along with words that consisted of 4 to 9 letters. These words came from the ASI doctor vocabulary storage, which were easy to hard and randomly presented. The score of emotional verbal memory capacity of individuals was estimated as the ratio of the words so that it was obtained the individual's recalled words in each effort. The other tools used include the Beck Depression Inventory, which consists of 21 items whose are ranked 0 to 3 based on symptoms of depression and severity. Score 0 means no sign and score 3 indicates its severity. In this questionnaire, five indicators of depression are evaluated: pessimism, feelings of failure, self-denial, suicidal thoughts, indecision, slowness, guilty feelings, expectations of punishment and self-blame, which are caused by a person's sense of worthlessness. Crying and changing the physical image of self, dissatisfaction and sadness; weight loss, physical complaints, fatigue, anxiety, sleepiness, insomnia and anorexia. This test, as a depression scale, has a widespread use in the United States and other countries. Beck's depression test has been used alone or with other depression tests to separate depressed people from non-depressed ones. This questionnaire has been translated into Persian and its validity and reliability have been obtained. The internal consistency for Iranian students is  $\alpha = 2.71$  and the reliability of the retest is  $r = 2.73$ . The 21-point scale is used to measure the severity of anxiety and anxiety in individuals. The scores of subjects ranged from 0 to 63, a score of less than 9 indicated non-anxiety symptoms, a score of 10 to 20 showed mild anxiety and a score of 21-30, indicated moderate anxiety and 31 to high severe anxiety.

Given that there was the significant difference between the means of the study groups in the verbal memory part based on the variance analysis of multivariate, and also based on the Tukey post hoc test, the difference between the group without post-traumatic stress disorder and the group with post-traumatic stress disorder was 3.08 and significant (0.004), which indicates that the more success of the group without posttraumatic stress disorder is in the task of verbal working memory capacity against the group of posttraumatic stress disorder, therefore hypothesis 1 was confirmed. Also, with regard to the mean difference between the control group and the post-traumatic stress disorder group, which is 12.81 and also with the non-post-traumatic stress disorder group, which is 9.73, hypothesis 2 based on more success of the task of verbal working memory capacity than the other two groups, was confirmed. Studies on the better performance of healthy people (strong in regulating the expressive and empirical aspects of their emotions) in encountering with the tasks requiring manipulation of information in a short time, were confirmed.

Regarding the fact that variance analysis of multivariate showed a significant difference between the research groups, in the Tukey post hoc test, the difference between the non- post-traumatic stress disorder group and the group with posttraumatic stress disorder was 7.75 and

significant (0.029). The results show that the success rate of the non-PTSD group compared to the PTSD group in the task of emotional visual working memory capacity. Therefore, hypothesis 3 based on more success of patients with no disorder than that of patients with post-traumatic stress disorder in the task of emotional visual working memory capacity was confirmed. A study on emotional visual working memory was conducted by Moradi and MirAbual-Fatihi, which included a group of post-traumatic stress disorder due to road accident, as well as depressed and anxious people, as it achieved the significant difference between mentioned memory capacity in all Research groups. But according to the mentioned researches, it was expected that in the present study, the difference between all the groups studied in the task of visual working memory was significant, but according to the results of Tukey's post hoc test, the mean difference between the control group and the non- Post traumatic stress disorder group in this task was 0.25 and with a significant level of 0.99. This is an insignificant difference between the control group and the group without posttraumatic stress disorder. Consequently, hypothesis 4 is not confirmed. This conclusion can be remarkable in this regard, which can facilitate our pathway in achieving memory details in groups with different disorders. It can be said that one of the reasons why the two groups did not have meaningful difference is the difference in the type of patients with the post-traumatic stress disorder had been clearly visible when the test was performed. Given that the patients in the present study are those with breast cancer, it can be stated that the effect of the type of cancer, as well as the person's morale and traits, During the clinical interview, was understandable and it was not ineffective in the result of the research.

### III. RESULT

From the historical view, in the study of working memory, verbal paradigms have been prevalent, such as complex task, which requires processing and storing information in memory.

Sometimes some people have trouble solving problems that require attention and information manipulation. For example, they are forced to repeat a question several times to solve a problem. On the other hand, some people are more capable of solving problems than others. In other words, there are some people who suffer from the limited capacity of their memory in confronting situations requiring attention and thinking, which reflects the different capacity of memory in different people. Many studies have shown that the range of these differences represents the limited capacity of human thinking, which has led to difficulty in confronting complex issues which need sharing and maintaining attention. In a study conducted by Dulgiish and Schweizer, participants with post-traumatic stress disorder caused by violence or sexual abuse, road accident, industrial injury, and natural disasters participated in a read-write task (which included two components Memory and operational) which was used in the field of emotional verbal working memory that resulted in a lack of verbal working memory capacity in people with posttraumatic stress disorder. In fact, in this study, the capacity of emotional working memory through the reading frequency task with emotional and neutral load in two groups with trauma, without posttraumatic stress disorder and having a history of post traumatic stress disorder during lifetime by the Schweizer S and daggleish Were compared. In their research, those with a history of post-traumatic stress disorder, as well as those who recently suffered from post-traumatic stress disorder, suffered from the integration of a task related to recalling short-term information with emotional components; and this could be considered as an important factor in the likelihood of recurrence of disorder after improvement. In addition, they did not consider the causative agent of post-traumatic stress disorder in their study then they assessed the patients who were faced with an accident, invasion, aggression and natural disasters. The results indicated that each person with any history of post-traumatic stress disorder had a weaker performance than other groups due to the integration of working memory capacity resources in the emotional field and also the performance of the capacity of emotional working memory in the two groups Post traumatic stress disorder and the traumatic group without a traumatic stress disorder showed a general defect of patients with posttraumatic stress disorder in performing cognitive tasks. Schweizer and Dagliish used only two groups to compare the capacity of emotional working memory and did not study the mood of patients while negative mood created a significant bias, which, led to weakness in doing the task, They also chose patients between the ages of 17 and 65, while age increase reduces the ability of centralized attention. Additionally, the task used in their research had a verbal nature that evaluated the cognitive beliefs and biases associated with Trauma, while Had not paid attention to evaluating visual symptoms of posttraumatic stress disorder.

#### IV. DISCUSSION AND CONCLUSION

Based on statistical analysis, the research hypotheses were examined so that there was a significant difference between the groups in emotional verbal memory but there was no significant difference in emotional visual memory between the group without post-traumatic stress disorder and control group. So that the change procedure in both types of memory as PTSD group had the lowest rate and there was not significant difference between the non-PTSD- group and the control group in the emotional visual memory capacity.

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