The Effectiveness of Problem Solving and Prolonged Exposure Therapy Methods and a Combination of Both on the Adjustment of Veterans Suffering from War-Related Post-Traumatic Stress Disorder

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Abstract

Aims: This study aims at comparing the effectiveness of three cognitive-behavioral therapy methods including problem-solving, prolonged exposure and a combination of both methods on the general adjustment of veterans suffering from war-related post-traumatic stress disorder.

Methods: This research was an experimental study using a pretest and a posttest. The research sample consisted of 100 veterans suffering from war-related post-traumatic stress disorder. The subjects were randomly divided into four groups for the problem-solving method, the prolonged exposure method, a combination of both methods and a control group, each composed of 25 members. The study tool was the Bell adjustment inventory.

Results: The results showed that the difference between all three methods in terms of general adjustment, and the subscales of home, work and social adjustments was significant (p<0.01).

Conclusion: Cognitive-behavioral therapy methods including problem solving, prolonged exposure and a combination of both methods are effective increasing adjustment in war disabled veterans suffering from PTSD.

Keywords: PTSD, Problem Solving, Prolonged Exposure, Veteran, Adjustment

Introduction

Accidents and disasters are an indispensible part of human life, so much so that, according to a study, 61% of men and 51% of women have been exposed to a harmful accident in their lives [1]. But only 8.6% of the general population have experienced a post-traumatic stress disorder at a point in their lives [2]. The prevalence of this type of disorder is higher in people with more exposure to danger, such as the military personnel, who, due to their job conditions, have been reported by researchers inside and outside Iran to be 30%-50% exposed to danger [3-5]. According to a report by the International Society for Traumatic Stress Studies, one in twenty of Second World War veterans showed a symptom of a mental problem such as sleep disorder, excitability, re-experiencing war accidents and memories. The report also reveals that both World War II veterans and those participating in the Afghanistan and Iraq war faced social and mental challenges. These challenges were related to adjustment disorders, drug and alcohol abuse, domestic violence, mistreatment of children at home, divorce and serious mental problems [6,7]. According to the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM IV-TR), the post-traumatic disorder is a kind of anxiety disorder appearing in people who have been exposed to a traumatic event, such as a serious car accident, a natural disaster (e.g., floods, earthquakes), a war, or have become a victim of physical and sexual abuse. The typical symptoms of a post-

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traumatic disorder include the return of the traumatic event through the contemplation or dreaming of the event, avoiding recollection of the event and reduced general performance [8]. In this type of disorder, a set of symptoms appear after exposure to an extremely traumatic agent, which could be having a direct personal experience of a deadly or life-threatening event, experiencing an event threatening the person’s physical integrity, witnessing somebody else’s death or something damaging or threatening their physical integrity, receiving the news of a family member’s or a close relative’s serious injury, unexpected death, or death accompanied by violence and being threatened to death or to injury [9]. When such a disorder appears as a result of war, it will never disappear on its own. Therefore, therapeutic interventions should be made quickly after the traumatic event and before the disorder has a chance for progress [10]. Post-traumatic stress disorder patterns involve a kind of re-adjustment, which according to many researchers, should be cured above all by means of cognitive-behavior therapy [11]. This is why most of the psychological studies on the post-traumatic stress disorder include cognitive-behavioral interventions so much so that these studies have really increased our understanding of this type of disorder [12, 13]. These studies include a variety of therapeutic techniques including the prolonged exposure method, the problem solving skills method, immunization against stress, assertiveness training and eclectic methods which could help people change their negative and improper thinking patterns and the related problematic behavior. I what follows, such cognitive-behavioral techniques are reviewed to see how effective they are in dealing with the post-traumatic stress disorder.

**Methods**

The prolonged exposure method is a cognitive-behavioral technique used in dealing with the post-traumatic stress disorder. This method aims at training people who are involved in avoidance behavior to face and overcome the fearful or anxious conditions, thoughts or memories [14]. In this method, the patient is exposed to the fearful stimulus by describing the details of his or her traumatic or fearful experience in vivo or imaginatively but in a safe and secure situation and directed by the therapist, and the exposure to the stimulus continues until the patient’s anxiety is lessened. The method is considered effective when it is directly implemented by the therapist, and not only the conditioned response stops but also the meaning of the traumatic event changes for the patient [15]. Barlow and Cerny consider the prolonged exposure method as a reformed kind of flooding in imagination and advice therapists to maximize its effects. They suggest that 1) the exposure should be prolonged 2) the exposure should be repeated until the patient’s fear is gone 3) the exposure should be performed gradually, that is, it should start with less fearful stimuli and progress to the more fearful ones; 4) the patients should pay attention to the fearful stimuli and maximize their contact and interaction with them; 5) the exposure should create anxiety and finally 6) the prolonged exposure method, like other methods, can be applied along with other therapeutic methods [16]. The previous studies on the effectiveness of this method implemented in 9-12 sessions on curing patients with post-traumatic stress disorders resulting from war, accidents or natural or artificial disasters reveal successful and enduring effects [17-19]. Similarly, a meta-analysis by Powers et al. [2] on 13 controlled studies with quasi-experimental and control groups, involving imaginary and real exposures confirms the effectiveness of the prolonged exposure.
method, compared to other methods, in curing patients with post-traumatic stress disorders such as soldiers, victims of artificial and natural accidents and victims of sexual abuse.

Another therapeutic method utilized in this study is the problem solving skills method, which is considered as a cognitive-behavioral method involving the training of clients in terms of mental and social skills, a method which has gained widespread use. In this method, clients are trained as to how they should deal with and solve their problems step-by-step [20]. Nezu and Perri [21] regard this method to be the common ground between all cognitive-behavioral methods, because the clients learn how to think, not what to think, when dealing with their problems. This method is also confirmed as effective in improving skills needed to face traumatic events. Lazarus [22] and Compaz [23], for instance, emphasizing the importance of problem solving skills and their effect on people’s mental health, point out two types of coping skills: 1) problem solving skills focusing on the problem, which include the assessment of the problematic situations, attempt to change positions, planning and looking for a solution and consulting others; and 2) the skill focusing on the excitement, which involves the affirmation of the problem instead of direct engagement with it, crying, getting upset and resorting to wishful thinking instead of planning to cure the problem. Researches also reveal the positive effects of the problem solving method on mental health, improving self-confidence, satisfaction with life, preventing suicidal thoughts and reducing the symptoms of post-traumatic stress disorders [22-27]. There are various ways of training problem solving skills which share many points. Various models of problem solving are designed for changing the patients’ cognition and are devised to carefully analyze the situations, problems and decisions based on responses and results.

Because of its general agreement and effectiveness in previous studies, the Davidson and Goldfried view has been used in this study [28, 29]. Although a wide range of studies have been done on the styles of problem solving and adjustment for curing the post-traumatic stress disorder, no single therapy method is enough to tackle this disorder. This is why combinations of methods have been used in some studies to deal with the PTSD and other related disorders of veterans [25-27]. In general, different types of therapy have been suggested for curing the PTSD and in most cases it is up to the therapist to choose among them. Most specialists, however, agree that social support is very effective in curing the PTSD. It is also recommended that therapeutic interventions are made as quickly as possible following the traumatic event and before the PTSD has a chance to advance, that is, around 24-72 hours after the event, when the patient could be encouraged to present a detailed and complete account of the event and his or her emotional reaction to the fearful event [30-32]. Benish, Imel and Wampold [33] accomplished 15 studies on the PTSD involving cognitive-behavioral techniques and found no significant difference between the techniques. Also, Bissan et al. [34] made a meta-analysis on 38 studies and found out that those studies involving cognitive-behavioral methods of dealing with the PTSD and eye movement desensitization and reprocessing (EMDR) were more effective compared to control and waiting list groups. In view of the importance of this issue, the aim of this study is to review and compare the effectiveness of the problem solving method, the prolonged exposure method and a combination of these two methods in the general adjustment of patients suffering war-related PTSD. This research was an experimental study carried out in
2007 involving three experimental groups and a control group, using a multi-group pretest posttest. The statistical population included the clients of a military hospital, and other medical centers of the army of the Guardians of the Islamic Revolution and of the Foundation for Martyrs and Veterans in Tehran, who were diagnosed with PTSD, based on the DSM IV-TR and on the results of clinical psychiatric interviews and who had a client file in one of these treatment centers. Of this population 100 subjects were randomly chosen, numbered and classified into four groups: problem solving, prolonged exposure, combined method and a control group.

The following were the general steps taken in the study. 1) The members of all four groups took the pretest. 2) The independent variables (problem solving training, prolonged exposure and the combined method) were introduced in the experimental groups. 3) All the groups took the posttest. Also, in order to check the practical limitations and tools of the research, a pilot study was carried out on 5 people and the results were utilized in planning the implementation of the main study. In order to prevent unexpected reductions in the number of the subjects and possible damages to the research, another 20 patients were added to the subjects and were equally divided in the four groups. The subjects who were chosen were already diagnosed with PTSD, had at least a diploma, lived in Tehran or the surrounding towns, were not involved in any other therapy at the time of participating in our study and were 35-60 years old. The patients who were excluded were addicted to drugs, were diagnosed with other mental disorders (except depression) or serious physical diseases.

The schedule of experimental groups’ treatment was as follows. For the problem solving method group, based on the Davidson and Goldfried model, 15 sessions were held, including 7 two-hour group sessions and eight 45-minute individual sessions. During these 15 sessions, patients were trained to recognize the problems as soon as they arise, to define the problem or issue, to understand the problem, to determine the goals related to the problem, to produce and present solutions to the problem, to assess the solutions and choose the best one, to implement the chosen solution and to evaluate the effectiveness of the solution. At this stage, the techniques were evaluated, the solutions were carried out, the therapy process was evaluated, decisions were made either to continue or to stop the therapy and the patients’ problems regarding the process were reviewed.

The prolonged exposure method group had the following schedule. The group took part in 15 sessions, namely, 2 collective sessions for the pretest, 13 individual sessions (2 sessions a week) for implementing the therapy and a final collective session for the posttest and concluding activities. The therapy included focusing on and reviewing the traumatic event, isolating the emotional aspects of the event as directed by the therapist, training and practicing tranquility, rehearsing exposure to the traumatic event in the presence of the therapist accompanied by tranquility, home assignments through imagination, note taking and voice recording to review the traumatic event without tranquility, regular reviewing of the details of the event while being tranquilized and checking the recovery process of the patients.

The schedule of the combined method group was as follows. Based on the plan for the other two groups, this group underwent 15 sessions, namely, 7 general collective sessions for training problem solving skills along with tranquility using recognition of negative thoughts and stopping them and 8 individual sessions for implementing the
problem solving process and focusing the traumatic event and carrying out the prolonged exposure method.

**The tools of the research:** In this study, a demographic questionnaire was used to gather demographic details and a Bell adjustment questionnaire was used to measure the general adjustment and its different aspects, including home adjustment, health adjustment, social adjustment, emotional adjustment and vocational adjustment to assess the different aspects of the patients’ life before and after the intervention. The Bell Adjustment Questionnaire is made up of 100 items and is provided in two modules: one for school and university students and the other for adults. In the present research, the adult version was used which included the five aspects of personal and social adjustment: 1) home adjustment, where high scores showed their improper adjustment at home and lower scores revealed good domestic adjustment; 2) health adjustment, where high scores point to unacceptably adjustment and lower scores to acceptable adjustment; 3) social adjustment, where higher scores point out social isolation and submission to society and lower scores reveal aggressive behavior in social contacts; 4) emotional adjustment, where people with high scores are considered emotionally unstable and those with lower scores stable; 5) vocational adjustment, where low scores reveal satisfaction with careers and high scores dissatisfaction. The validity of each aspect of the questionnaire and its general score were examined with the Spearman-Brown correlation and revealed to be 0.91 for home adjustment, 0.81 for health adjustment, 0.88 for social adjustment, 0.91 for emotional adjustment, 0.85 for vocational adjustment and 0.94 for all. The reliability of the questionnaire was determined in two ways. First, the items of each part of the questionnaire were chosen in areas where there was a clear difference between the high 50% and the low 50% scores of the adults. Second, it was made sure that the questionnaire was created after consulting counseling specialists working with adults and designed based on the results of the subjects who had an adjustment rate between “very low” and “very high,” and also determining the way in which the questionnaire could differentiate between the subjects. The validity of the questionnaire had been confirmed by Delavar and studied by Mohammadian and Sherbaf, who achieved results similar to those of the questionnaire designer [35].

The data collected through the pretest and posttest were then analyzed using descriptive statistics methods (such as prevalence, percentage, mean and standard deviation), inferential statistics, the covariance test for determining the significance of the mean differences, Least Significant Difference (LSD) tests for comparing and finding significant differences between the groups using the SPSS software.

Ethical considerations: The following ethical points were taken into considerations: 1) The subjects were free whether or not to participate in the research; 2) the relevant information about the research was given to the subjects; 3) the collected data were kept confidential; 4) no private or unnecessary question was asked from the subjects; 5) unnecessary private or personal data of the subjects were not archived; 6) each subject was identified with a code number; 7) the subjects were given a certificate of participation in the research by our psychiatrist colleagues; 8) the subjects’ transportation costs were reimbursed; 9) a thank-you present was given to each subject at the end of the research and 10) the control group was provided with reasons for the necessity of their participation in the research.
Results
The subjects were aged between 34 and 57. The mean and standard deviation of their age were 42.37 and 4.55, respectively. 49 subjects had a job and 51 were either retired or jobless at the time of the research. There were 24 subjects in the problem solving method group, 25 in the prolonged exposure, 26 in the combined method and 25 people in the control group. 51% of the subjects had a diploma, 27% an associate degree, 14% a bachelor’s degree and 8% higher masters or higher degrees. Table 1 and 2 depict the means and standard deviations of the total score and the subscales of the subjects’ adjustment.

Table 1) Means and Standard Deviations of the Total Score and the Subscales of the Subjects’ Adjustment Based on the Pretest

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pretest</th>
<th>Home adjustment</th>
<th>Health adjustment</th>
<th>Emotional adjustment</th>
<th>Vocational adjustment</th>
<th>Social adjustment</th>
<th>General adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>12.19</td>
<td>16.19</td>
<td>21.69</td>
<td>15.69</td>
<td>17.73</td>
<td>83.58</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>1.076</td>
<td>0.800</td>
<td>0.644</td>
<td>1.263</td>
<td>1.066</td>
<td>2.249</td>
</tr>
<tr>
<td>Combined</td>
<td>Mean</td>
<td>11.38</td>
<td>14.88</td>
<td>20.46</td>
<td>15.75</td>
<td>19.50</td>
<td>81.33</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>0.642</td>
<td>0.964</td>
<td>1.014</td>
<td>1.158</td>
<td>1.891</td>
<td>2.521</td>
</tr>
<tr>
<td>Problem solving</td>
<td>Mean</td>
<td>14.40</td>
<td>16.76</td>
<td>17.88</td>
<td>15.36</td>
<td>17.52</td>
<td>81.20</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>1.008</td>
<td>0.805</td>
<td>1.161</td>
<td>1.024</td>
<td>0.885</td>
<td>3.374</td>
</tr>
<tr>
<td>Exposure therapy</td>
<td>Mean</td>
<td>11.64</td>
<td>14.80</td>
<td>15.88</td>
<td>15.80</td>
<td>17.20</td>
<td>75.24</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>1.091</td>
<td>0.814</td>
<td>1.542</td>
<td>1.229</td>
<td>1.038</td>
<td>4.321</td>
</tr>
<tr>
<td>Control group</td>
<td>Mean</td>
<td>12.41</td>
<td>15.67</td>
<td>18.99</td>
<td>15.65</td>
<td>17.97</td>
<td>80.36</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>0.497</td>
<td>0.425</td>
<td>0.602</td>
<td>0.579</td>
<td>0.489</td>
<td>1.614</td>
</tr>
<tr>
<td>Total</td>
<td>Mean</td>
<td>10.88</td>
<td>15.88</td>
<td>16.00</td>
<td>12.31</td>
<td>13.81</td>
<td>67.65</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>0.932</td>
<td>1.345</td>
<td>0.958</td>
<td>0.760</td>
<td>1.141</td>
<td>3.396</td>
</tr>
</tbody>
</table>

Table 2) Means and Standard Deviations of the Total Score and the Subscales of the Subjects’ Adjustment Based on the Posttest

<table>
<thead>
<tr>
<th>Groups</th>
<th>Home adjustment</th>
<th>Health adjustment</th>
<th>Emotional adjustment</th>
<th>Vocational adjustment</th>
<th>Social adjustment</th>
<th>General adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>10.88</td>
<td>15.88</td>
<td>16.00</td>
<td>12.31</td>
<td>13.81</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>0.932</td>
<td>1.345</td>
<td>0.958</td>
<td>0.760</td>
<td>1.141</td>
</tr>
<tr>
<td>Combined</td>
<td>Mean</td>
<td>10.96</td>
<td>15.08</td>
<td>15.63</td>
<td>14.33</td>
<td>16.13</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>0.487</td>
<td>1.147</td>
<td>1.216</td>
<td>0.802</td>
<td>0.772</td>
</tr>
<tr>
<td>Problem solving</td>
<td>Mean</td>
<td>11.48</td>
<td>13.92</td>
<td>14.40</td>
<td>13.92</td>
<td>15.00</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>0.656</td>
<td>0.789</td>
<td>1.079</td>
<td>0.697</td>
<td>0.913</td>
</tr>
<tr>
<td>Exposure therapy</td>
<td>Mean</td>
<td>11.48</td>
<td>13.92</td>
<td>14.40</td>
<td>13.92</td>
<td>15.00</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>0.656</td>
<td>0.789</td>
<td>1.079</td>
<td>0.697</td>
<td>0.913</td>
</tr>
</tbody>
</table>
The Effectiveness of Cognitive Behavioral Therapy Methods on PTSD

A covariance analysis was utilized to determine the significance of the means differences. In order to make use of the covariance analysis, the assumption that the variances were the same was checked using the Levin test, which showed that the scores’ variances of all the groups were the same in all variables. The results of the covariance analysis of all four groups are compared in Table 3.

<table>
<thead>
<tr>
<th>Adjustment</th>
<th>Factors</th>
<th>Degrees of freedom</th>
<th>Mean squares</th>
<th>F value</th>
<th>P significance</th>
<th>Effect value</th>
<th>Statistical power</th>
</tr>
</thead>
<tbody>
<tr>
<td>General adjustment</td>
<td>Pretest Group membership</td>
<td>96</td>
<td>448.349</td>
<td>6.413</td>
<td>0.001 (**</td>
<td>0.926</td>
<td>1</td>
</tr>
<tr>
<td>Home adjustment</td>
<td>Pretest Group membership</td>
<td>3</td>
<td>164.675</td>
<td>355.2</td>
<td>0.02 (*)</td>
<td>0.768</td>
<td>0.945</td>
</tr>
<tr>
<td>Health adjustment</td>
<td>Pretest Group membership</td>
<td>3</td>
<td>16.333</td>
<td>5.827</td>
<td>0.002 (**</td>
<td>0.271</td>
<td>0.935</td>
</tr>
<tr>
<td>Emotional adjustment</td>
<td>Pretest Group membership</td>
<td>3</td>
<td>15.346</td>
<td>0.990</td>
<td>0.405</td>
<td>0.059</td>
<td>0.253</td>
</tr>
<tr>
<td>Vocational adjustment</td>
<td>Pretest Group membership</td>
<td>3</td>
<td>11.888</td>
<td>0.595</td>
<td>0.621</td>
<td>0.037</td>
<td>0.164</td>
</tr>
<tr>
<td>Social adjustment</td>
<td>Pretest Group membership</td>
<td>3</td>
<td>15.354</td>
<td>0.941</td>
<td>0.430</td>
<td>0.063</td>
<td>0.239</td>
</tr>
</tbody>
</table>

* being significant at 0.05 and ** being significant at 0.10

The covariance analysis showed that there was a significant difference (p<0.01) between the results of the pretest and the posttest in terms of the total score and subscales of adjustment. In other words, as far as general adjustment is concerned, the reduction in the groups’ scores point to the effectiveness of the methods compared to the score of the control group. The results also showed that the role of group membership was significant (p<0.01) in the scores of general, home, vocational and social adjustment. An LSD test was used to compare the groups, which showed that there were differences between the combined method group, control group and problem...
solving group. There was more adjustment in the combined method group compared to the other two.

**Discussion and Conclusion**

The results of this research showed that the problem solving method, prolonged exposure method and a combination of both were effective in improving the general adjustment of patients suffering from the post-traumatic stress disorder. Other results show a similar effect of these methods of therapy on the subscales of patients’ adjustment. These results are in agreement with the findings of Malouff et al. [20], Tarrier et al. [12], Becker et al. [18], Ahmadizadeh et al. [19], Foa et al. [15] and Beck and Coffey [17]. Also, the findings of meta-analyses by Powers et al. [2], Benish et. al [33]and Bisson et al. [34] confirm the effectiveness of these methods in reducing post-traumatic stress. In addition, studies by Nezu et al. [21], Amir et al. [27], Compas [23], Tull [14] and Mohammadi [36] similarly reveal the effectiveness of these methods of therapy in improving patients’ general adjustment while dealing with stressful situations, increasing their cognitive skills, tendency to involvement in crises and a sense of cooperation as an effective technique in tackling problems, improving social skills, self-efficacy, self-esteem and finally in reducing the symptoms of PTSD in soldiers and the victims of artificial and natural disasters and of sexual abuse. The findings showed there was a difference in the effectiveness of the combined method and of the other methods. The group under the combined method of therapy showed a higher degree of general adjustment compared to those undergoing the exposure and problem solving methods. However, there was no significant difference between the groups in terms of their emotional and health adjustment. It seems that changes in these two types of adjustment tend to take a longer time since it takes patients longer to change their personal thinking patterns and cognitive skills to effectively face internal and personal elements reducing adjustment. The better effect of the implemented methods of therapy in reducing the other subscales of adjustment, such as home, social and vocational adjustment, reveals that cognitive-behavioral interventions teaches the patients the right ways of dealing with problems and helps them in improving their cognitive skills and achieving higher levels of adjustment. The combined method, which uses the benefits of the other method at the same time, prepares the patients for cognitive restructuring. Generally speaking, nowadays therapists tend to use eclectic methods, especially for dealing with patients suffering from war-related PTSD, who need more support and more effective therapy [15]. In eclectic or combined methods, the therapist can decide which method is beneficial for which patient because, at their best, these combination methods consist of effective and organized implementations of different methods. In the present study, the negative internalized emotions of the subjects were externalized in supervision of a therapist and using the prolonged exposure method. The subjects were then taught, using the problem solving method, how to think and deal with their problems properly. This is why the combined method had a positive effect on the patients compared to the control group. It is suggested, therefore, that the prolonged exposure method, as an effective method, should be used in reducing negative emotions especially at the times of wars and other crises in order to fast-track help to those exposed to serious traumas. To this purpose, it is suggested that therapists should be trained in special workshops. It is also recommended that therapists make use of the proposed combined method of this research to cure the patients with PTSD in order to control their negative excitements, affect other aspects of the patients’ lives, help them
with their cognitive and emotional restructuring and lead them to the right ways of thinking and tackling problems in life. In order to avoid the limitations of this research, such crossing out subjects because of their degree of education, being single, non-war related traumas, patients’ previous treatments, difference in their social and economic status and problems resulting from change of timetables of the medical centers, it is recommended that these limitations should be tackled in future researches and therapy should be continued to achieve higher degrees of effectiveness.

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