The Current situation and treatment of PTSD during the novel coronavirus disease 2019 (COVID-19) pandemic

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Abstract. In recent years, with the continuous spread of the COVID-19, the post-traumatic stress disorder (PTSD) has gradually become the major mental disorder which puzzles the people's psychological problems. PTSD has a high incidence rate in people who have experienced one or more trauma, but not all people who have experienced trauma will suffer from PTSD. Research shows that most patients with post-traumatic stress disorder often have one or more other mental diseases, including major depression and substance abuse or others (like bipolar, anxiety and so on). As a mental disorder with high risk and high suicide rate, PTSD is easy to be comorbid with depression, anxiety, sleep disorders and other symptoms, which not only makes patients more painful, but also greatly increases the difficulty of treatment. Although traumatic events are a necessary condition for diagnosis of the PTSD, they are not the sufficient condition for occurrence of the PTSD. At present, a lot of research has been done on PTSD, but its pathogenesis is still not completely clear. The causes may include genetic susceptibility factors, childhood psychological trauma, and other negative life events before and after traumatic events.Psychotherapy and drug treatment are the main treatment schemes for PTSD at present, but in the epidemic environment, these treatments have certain inconveniences, which reflects the advantages of telemedicine. In the future, people should obtain more and more evidence-based evidence from multiple perspectives in order to obtain the best curative effect.

Keywords: Post-traumatic Stress Disorder (PTSD), COVID-19, Influence Factors, Stress resilience, Treatment

1. Introduction

Post-traumatic stress disorder (PTSD) is mental disorders dominated by a variety of psycho-behavioral abnormalities and psychological disorders caused by sudden and extraordinary threatening and catastrophic events such as battlefield environment, natural disasters, accidents, severe trauma, etc. After be diagnosed as the PTSD, the lifetime prevalence of containing PTSD ranges 64% ~90% [1].

Research shows that most patients with post-traumatic stress disorder often have one or more other mental diseases, including major depression and substance abuse or others (like bipolar, anxiety and so on). It is easy for patients to cause significant psychological pain, on the other hand, it will cause serious damage to social functions, and even ultimately endanger the patient's life. The PTSD is only psychopathology that need the presence of traumatic event(s) to be diagnosed. Traumatic events are quite prevalent in day-to-day life. However, only a relatively small portion of people will be diagnosed as PTSD or other stress-related disorders which may be explained by variance of stress coping methods among individuals that decide the level of stress resilience or susceptibility of each person. Research finding shows that the relationship between stress resilience and PTSD risk [2].

For PTSD, trauma is only a necessary condition, and it does not necessarily develop into post-traumatic stress disorder after trauma. There are many studies on the predictive factors of PTSD, and the results are repeated or inconsistent due to different research methods and research objects.

Epidemiological investigation has found that PTSD is related to the victim's family history, family environment, gender, age and personality characteristics points, genetic quality, previous psychophysiological trauma history, living environment, education level, nature of trauma events and post-traumatic intervention measures.

The outbreak of COVID-19 at the end of 2019 has spread all over the world, and public health and safety are facing unprecedented challenges, It spreads widely and rapidly, causing great panic to the whole society, especially after COVID-19 patients who receive comprehensive closure measures are discharged from hospital, facing the social environment and high anxiety and stress accompanying family members, it will lead to physical and emotional exhaustion, and a long-term persistent mental disorder after experiencing serious physical and mental trauma [3].

The main therapy of PTSD is the combination of psychotherapy and medication. However, there may be some limitations, and the treatment cycle is long. The key to PTSD treatment is prevention, and the main measures are to strengthen safety education and labor protection to prevent trouble before it happens. Therefore, the pathogenesis, diagnosis and treatment of PTSD still need further research, especially in the current epidemic environment.

Last 30 years has witnessed considerable increase in the study of PTSD and resilience against PTSD. This paper will involve the genetic and physiological mechanism underlying PTSD and stress resilience which may provide novel insight into PTSD prevention, diagnosis and treatment, and also summarize the current understanding for the COVID-19 mental health effects. It is imperative to understand how genes and traumatic stressors increase the vulnerability to develop stress-related disorder including the PTSD, especially the epidemic of 2019 novel coronavirus SARS-CoV-2 spread the world and poses many unprecedented risks for developing PTSD. This paper will also involve the relationship between resilience and PTSD and novel intervention for PTSD.

2. Correlation between PTSD and COVID-19

2.1. The psychological challenge provided by COVID-19 pandemic

From the outbreak of the COVID-19 beginning, many revealed an increased prevalence of extensive psychological distress including depression and anxiety, obsessive-compulsive and PTSD symptoms [4]. The connection between the onset of pandemic and the elevated case of PTSD is that the pandemic has provided with a series of traumatic stressors. It is very important to identify the risk factors of the PTSD provided by the unprecedented pandemic.

Currently, many studies have enumerated the stressors during the pandemic that contribute to the development of PTSD [5]. The policies that local government implement evolved through time. Until now, we are still facing the challenge the pandemic brought to us. Since the outbreak, response efforts made by government involves mandatory quarantines. Long period of time stayed at home and socially isolated state has led people to “desperate plea”. At the beginning of the spreading, people have little knowledge about the virus, according to a survey conducted in China at the early stage of the pandemic, about 10% to 30% people were in great worry of contracting the virus. Seeing the family member or friends got ill or passed away make they feel fear, or panic, or anger and or a loss of certainty about their health condition.

As the management of the COVID-19 pandemic went normalized, people are still experiencing significant changes in daily routines. The challenge brought by the pandemic has greatly increased the uncertainty to their future. Moreover, social isolation can largely devastating during the pandemic considering the directives for social distance and mandated quarantine. Studies indicates that individuals under age of 25 who will be the dominant workforce have experienced elevated level of loneliness. Therefore, the certain risk and the protective factors need to be specifically identified to maintain the healthy mental state. The risk factors the pandemic provided are partly summarized as follow: extended time of uncertainty about the future accompanied with a sense of uncontrollability; worries about infected by COVID-19, becoming severely sick, and even die; worries about the losing

closed people, and sadness associated with real losses; the trauma associated with being gravely ill with the COVID-19, et al [6].

For the mental health care providers, What is alarming to know is that the people are in the uniquely challenging position of both personally experiencing the disruptive influences of chronic stress associated with the pandemic and working with patients and other vulnerable individuals to mitigate the consequences of the stress and tragedies that they are experiencing.

2.2. Pandemic impact to different group of people

Before the pandemic, there is already difference of PTSD prevalence among different group of people. There is a great amount of heterogeneity of the prevalence of PTSD. The US-Latinos, the African Americans, and the American Indians has the higher rate of the PTSD compared with the US-Latino whites. And Asian Americans have the lower prevalent of PTSD, after adjustment for traumatic exposure and demographic variables. Upon the outbreak of COVID-19, there are also difference in coping the stress. Therefore, it is critical to underscore the need to provide additional resources to underprivileged and marginalized individuals.

For example, the more vulnerable groups include the people with the psychiatric disorder, and the healthcare workers, and the people with a socioeconomic status at low level. During pandemic, Black and Latino households are twice as the same as the White households to experience food insufficiency [7].

As medical workers, front line clinical nurses rushed to the front line immediately after the arrival of the epidemic, facing the epidemic directly, with the psychological challenges, as well as the physical challenges. The psychological status of front line clinical nurses will directly affect the quality of nursing, and then consequently affect the treatment and rehabilitation of patients. Compared with the public health workers who work indirectly, the workers directly associated with covid-19 are more sensitive to the symptoms of PTSD or depression to a certain extent. Sometimes, the workers face death directly and cause their own psychological stress response. If they cannot be adjusted in time, it may lead to PTSD.

At this time, appropriate psychological intervention strategies should be taken immediately and monitored in time, In order to reduce the risk of PTSD, anxiety or depression of these high-risk groups working in the front line.

3. Influencing factors and mechanism of PTSD

3.1. Influencing factors of PTSD

Genetic studies may provide important clues to these individual differences in vulnerability. Classic psychology studies the twin and the adoption study to techniques to quantify genetic and environmental influence in the susceptibility on getting PTSD and conclude that PTSD is moderately heritable, around 34% [8].

Genome-wide association studies (GWAS) combined with twin studies have investigated potential genetic and environmental effects, it found that the common genetic variation of post-traumatic stress disorder is about 5% - 20%.

PTSD is caused by environmental stressors. Empathy refers to the ability to stand in the position of others, observe and experience their feelings and make the judgments with others' values, which may make individuals react differently to life events. Individuals with high empathy may be more emotionally sensitive to trauma. A recent evidence-based study verified this hypothesis with genetic information. Using the British biobank, it investigated the correlation between empathy and PTSD severity (n=126219). The results showed that the higher of the genetic tendency of empathy, the more sensitive emotions, making individuals prone to more serious symptoms of the Post-traumatic stress disorder [9].

Some scholars have proposed that the genetic research of PISD should pay more attention to the endophenotype, such as the dysfunction of the thalamus pituitary renal gland (HPA) axis, high

alertness and excessive startle response. Compared with the diagnosis of PTSD as a whole, the number of genes involved in these more basic single psychopathological features will be less, making the research more simple and clear [10].

3.2. The neurologic mechanisms of PTSD and stress resilience

Beside the GWAS study that conducted in the human beings, there are abundant studies that focus on neurobiological study of PTSD animal models and resilient. Stress resilience is the opposite with PTSD and it negatively correlated, which provides us a precise view of the mechanism in PTSD development [11].

More recently, many other studies have focused on predicting or promoting individual differences in preexisting PTSD. Resilience studies related to PTSD provide people with ways to understand the normative functions of individual strengths, protective factors, and human adaptive responses to environmental adversity and trauma. The results show that in a mouse model of social stress, there is a functional difference in the release of stress-responsive IL-16 by bone marrow derived leukocytes, which contributes to social stress-induced behavioral abnormalities and is the strongest predictor of behavioral responses to subsequent social stress responses [12].

The genetic differences are not key to the pre-existing difference, indicating it may due to epigenetic/ environmental factors. The resilience research leads to the need of deeper explanations for the of the pre-exsting molecular differences, stress sensitivity happens in paternal transmission and demonstrated similar behavioral responses to stress.

In the future, more evidence-based evidence and large sample trials are needed to better explore the pathogenesis and mechanism of PTSD. Validation of the results produced from model animal is also needed.

4. Interventions and treatment to PTSD

4.1. Psychotherapy of the PTSD

The treatment of the PTSD requires both psychological and pharmacological treatment. Among them, Psychological treatments are the more important and are the main method to treat PTSD. And some studies have shown that Psychological treatments are more effective than pharmacotherapy in RCTs. In terms of psychotherapy, treatment guidelines consistently recommend CBT for chronic PTSD. As a method widely used in the treatment of clinical psychological problems, CBT integrates behavioral therapy and cognitive therapy through a goal-oriented and systematic program, so as to solve the obstacles of emotion, cognition and behavior, and improve its functional level. The more effective CBT treatments are CT and prolonged exposure. In an epidemiological study,95% of those who recovered within one year of the traumatic event. Early intervention is therefore better at preventing chronic PTSD [13].

Under the influence of the current epidemic, the isolation at home and other obstacles or delays patients seeking PTSD treatment. Distance, sharp economic decline, lack of local resources, etc., have been recorded as obstacles to individual access to psychotherapy. Telemedicine is an effective method to provide psychotherapy. Its initial implementation was to expand the popularity of treatment and cover rural people. Cognitive processing therapy (CPT) is a trauma centered evidence-based treatment for post-traumatic stress disorder. Providing CPT through the telemedicine can significantly reduce PTSD symptoms, and the effect is equivalent to face-to-face treatment, at the same time, it can also reduce the travel time of treatment [14].

4.2. Drug therapy of the PTSD

Most patients choose medication to manage the onset. Some studies have shown that SSRIs are effective in reducing symptoms associated with PTSD. Since only one drug can alleviate all symptoms of PTSD, combination drugs are often used in treatment.

One study showed that SSRIs are effective in treating PTSD on a short-term (14 weeks) and long-term (e.g., 1 year) basis. However, SSRIs do not completely resolve the problem of PTSD, and SSRIs will alleviate some of the distress produced by PTSD, but cannot remove it completely. Specifically, only about 60% of patients can be affected by SSRIs, and only 20-30% of them have a treatment effect. Pharmacotherapy is a longer process for chronic PTSD, but has a stabilizing effect on the patient's condition. CT mainly addresses trauma-related cognitive problems; prolonged exposure can expose the patients to traumatic situations and thus overcome their fears. Although drug treatment of PTSD can effectively alleviate the symptoms of depression and anxiety, there are also adverse reactions such as addiction.

4.3. Traditional Chinese medicine therapy of the PTSD

As the characteristic therapy of traditional Chinese medicine occupies an indispensable position in clinic, there are also continuous clinical studies on the treatment of PTSD. Because of its simplicity, convenience, ease, cheapness and less side effects, it is widely used in PTSD treatment. Acupuncture is only used in clinical practice as an auxiliary medical means of PTSD, and it can still benefit many patients with such diseases. At the same time, the acupuncture treatment faces fewer language barriers and cross-cultural challenges than psychotherapy, and has stronger clinical adaptability and popularization. Acupuncture clinic can provide treatment services for many people at the same time, which is more time-saving, labor-saving and cost-effective than individual psychotherapy.

By studying the data on psychological changes in people with COVID-19 and those in close relationships, attempts can be made to minimize the impact on the physical and mental health of society and individuals. There are many relevant factors that influence resilience, such as: genetic factors, life circumstances, past experiences, etc. An attempt could be made to run a platform to distinguish the different types and develop interventions related to them, and the approach could be used to reduce the risk of psychopathology in strong stress or crisis situations.

5. Conclusion

PTSD is a mental disorder and a major international public health problem. It not only endangers the physical and mental health of patients, affects their social functions, but also affects their families and society, and may cause social or economic damage. The popularity of COVID-19 makes the related problems of PTSD more urgent to be solved. At present, the definition and diagnostic criteria of PTSD still have some complexity and fuzziness, which may be related to the individual differences of PTSD patients and the lack of research. The nature and exposure of traumatic events, the particularity of occupation, gender, personal characteristics and social attribute support will have an impact on the production of PTSD.

At the same time, there are still many problems to be discussed in depth, for example: in terms of epidemiology, there is a lack of screening and evaluation of sensitive monitoring indicators in psychophysiology and neurobiology, which are of great significance in the prediction and diagnosis of PTSD; In terms of the mechanism of PTSD, there are relatively few reports on the basis and experimental research of PTSD cognitive impairment and its prevention and treatment; There are few studies on screening objective, effective and specific biomarkers of PTSD, and there is a lack of objective indicators for early warning diagnosis and treatment efficacy evaluation of PTSD at present. The pathogenesis of PTSD should be further explored.

Trauma and emergencies are the main causes of PTSD patients at present, and they have a certain genetic tendency. In terms of treatment, psychological intervention is still the first-line treatment, which can alleviate PTSD symptoms to varying degrees. Each psychological intervention therapy has a lot of evidence to show its effectiveness. Among the possible options, the treatment with a higher level of evidence should be the first choice for PTSD treatment. In the future, people can study the comparison of different therapeutic effects, indications, personalized treatment and other aspects, and

further expand the width and depth of PTSD research field. More evidence-based evidence is also needed to verify the stated point of view.

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