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## Psychological support and its relationship with the immune system during the pandemic

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### ABSTRACT

The main target for this research is to know how the Coronavirus affected specially on the individual and on the society in general with anxiety and panic that resulted from the social media and communication about the severity of this virus and how quickly it spread and also fake news about the infected people and their numbers. So we try to show how it's important of the psychological support for the society generally and raise the healthy awareness between people, also as this research showed how it's necessary for people is to preoccupation in other things rather than social media like mental and physical exercises as well as reading and other useful things. From the basic things that we focused on it is the people immune and how it's get affect by the psychological anxiety, as most studies and researches have been found a relation between the psychological anxiety and the patient immune which it was an inverse relationship as in case of increase the anxiety it will cause a lower immune response and increase the probability of infection specially COVID-19. The comprehensive ban have prevent the society from the communication together to confined the virus and reduce its separation but there must be some alternatives that support people psychologically and physically. As also its important to mention that the panic cases in increase during the comprehensive ban specially in the social areas and countries, for example in Iraq the comprehensive ban was a reason that prevent the communication between relatives and that lead to the psychological fatigue for many people because the interruption that happened with the relatives and the society.

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### 1. Introduction

The Coronavirus disease 2019 outbreak has been rapidly transmitted in January 2020 and aroused enormous attention globally. The novel coronavirus disease (COVID-19) is formerly known as the (2019-nCoV) Pneumonia', which was originated from a wet market in Wuhan, China in early December 2019 [1]. COVID-19 it's a wide strain of viruses that could cause diseases for animals and humans. It's also known that a numbers of coronaviruses could cause for humans a respiratory diseases its intensity range between common colds and to the most intensity diseases like middle east respiratory syndrome (MERS) and sever acute respiratory syndrome (SARS) and the last thing was discovered is COVID-

19 which appeared in Wuhan in China 2019 and its considered from the coronaviridae (Fig. 1) [2].

The attention in the mental health during the epidemic it's very important so the necessary measurements must be done to keep the mental health for the affected societies with COVID 19. Where fears about spread the virus from one to another could effect on the social cohesion and mark a negative impact on the mental health. Where the media was additional reason that associated in spreading the panic in public. Most people feel the need to the social reactions and to communicate with other people and with the present of corona virus and the total prohibition so they will show the anxiety and depression symptoms on some individuals. So they must focused on alternatives activates for exploiting the time like sport, reading, and mental exercise [3]. And since the crisis began in the late of 2019 in china and the virus start to separate in china and other countries, its seemed clearly that the social media platforms, that there is something like panic that promoted by a large

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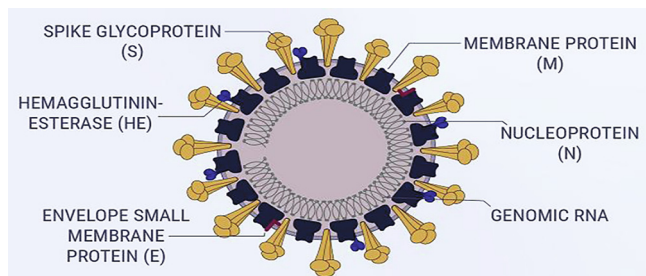


Fig.1. Structure of Coronavirus.

segment of social media pioneers. And it was remarkable how twitter is moved as it considered the most popular site in the Arab countries, to declare a ban to the “mislead content “ about the epidemic and its worked to remove any content undesirable that promote for specific and misleading allegations about the corona virus. By this we notes that spreading the false and horrific news for humans life could affect badly on the individual and that lead to create a lot of people that felt by frustration and grumbling due to this fake news that posted on the social media specially Facebook and twitter, that affect their lifestyle significantly. Where the total numbers of infected people since the crisis at 24 Feb 2020 until 19 Dec about 583,118 and total of deaths about 12,680 according WHO and Iraqi ministry of health [4].

## 2. Curfew

The total ban which was imposed by the governments a main role in paralyzing the world economic movement also the totally cessation of economic activates and all the institutions became economically ineffective. Also the effect of the virus on social and service aspects was very clear as many countries were forced to lockdown their educational, religious and service institutions and that greatly affected on the psychological state of the society from the repression that occurred due to the lack of communication and the isolation away from the society. This misdemeanor make people feel panic and fear inside the house all this reasons could lead to spread the virus as it related to the people immunity [5].

## 3. The effect of climate on the person immunity

The climate play an important role in transport of the virus and its separation as there is agreement that there are some differences for the epidemic separation in the different climate areas, the climate change could lead to immunity disorders specially the immunocompromised. From the most important examples for the climate change is deficiency in Vitamin D which the exposure to the sun light during winter is very little and in some countries nonexistent so they are able to get infect easily. The first believe was that COVID-19 is a seasonal condition due to the great similarity in the RNA of the virus with seasonal influenza which appeared in the winter due to cold and climate disorder, but when the summer season coming the virus didn't affected by the heat and the numbers of infected people still in increase specially in Iraq during absence of the sufficient awareness for the society also inability of the hospitals to prepare the necessary apparatus to the infected people and that lead for death a lot of patients in Iraq [5].

## 4. Psychoneuroimmunology

The immune system have perfect mechanisms against foreign bodies that attack our body and cause diseases, but the response

of our immunity system as increase temperature during fever when get infected and losing energy specially at losing appetite and not eating make a serious problems on the body so the human developed a group of psychological responses which is called by Chaler from The university of British Columbia in Canada to be the first line of defense. Where the most important obvious responses is our feeling of disgust when we avoid things with bad odor or contaminated food. The researchers suggest also that we tend to remember the subjects that make us feel disgust greatly and this let us to avoid the situations that could lead to affected on us. This immune system is differ from person to another and not everyone will be affected with the same level when treat with COVID-19 as some individuals have a very sensitive Psychoneuroimmunology make them react greatly with things that they think it's a source of danger or it's a cause for infection, so those people be more respectful to the social norms and realize that the increased risk of the diseases lead to tighten them in this situations [6].

## 5. The effect of COVID – 19 on the immune system

People get affected when the crisis are happened and they feel anxiety about them self but when the panic and fear more than normal it lead to serious risks to the vital systems and the immune system (Fig. 2) as there are numbers of signs that show the excessive anxiety including [7]:

- Insomnia
- Losing appetite either increasing or decrease.
- Continuity watching news and inability to stop.
- Intense emotion.
- Social isolation.
- Storage food more than needed.

The effect of excessive anxiety affected on the person himself and the people around him and that lead to disorder of the main systems in the body and cause a serious damage in the immune system, which is get affected by different ways including (Fig. 3):

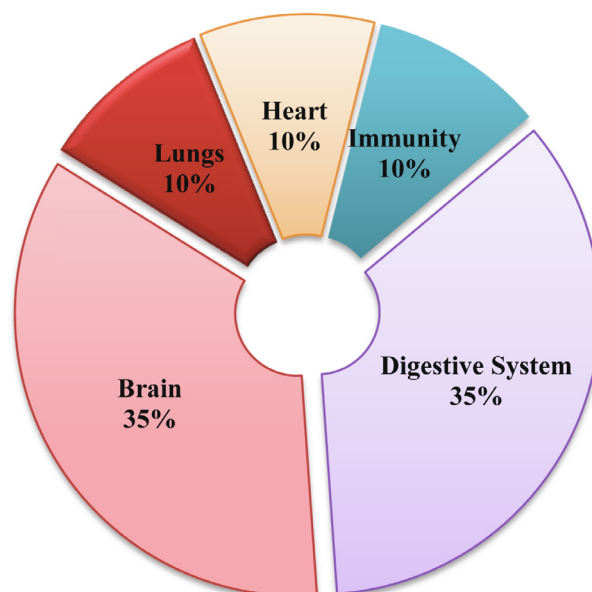
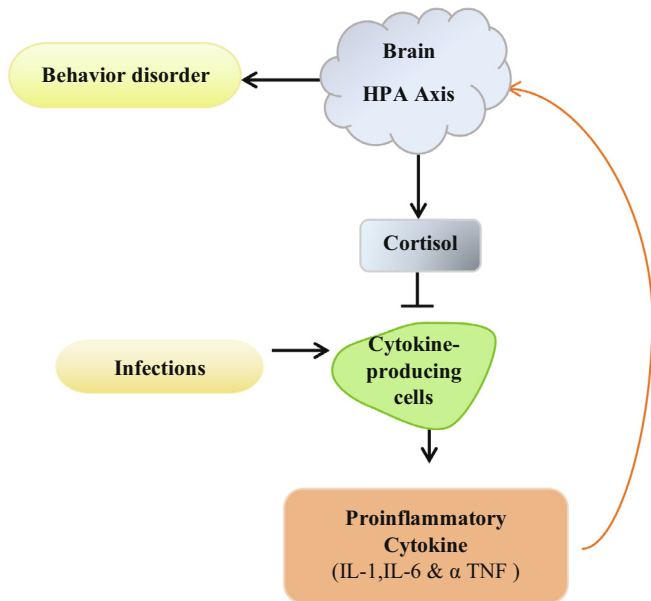


Fig.2. Damage to the feeling of anxiety and tension on the organs of the body.



**Fig.3.** Inflammatory Cytokines respond to infection. Arrow indicate motivational path, and lines on the left show inhibitory path.

- Increasing the production of cortisol hormone which is cause lack of proteins that responsible to stimulate immune cells against foreign bodies so person could easily infected.
- Affected on the lymphatic cells which has a main role against viral infections so lead to suppression of the efficient of immune system.
- Finally, the anxiety could lead heart diseases, blood vessels and diabetes.

## 6. Cytokines and the regulation of the immune system

The regulation process of the responses against the infectious diseases controlled by certain proteins work as signals between cells for the immune responses regulation it's called cytokines, it's also transmitted the signals to receptors that present on the surfaces of the cells and delivered it to the body. It has two types one of them enhance the inflammation (proinflammation cytokines) and the other prevent it (Anti – inflammatory cytokines). And the proinflammatory cytokines include IL1, IL6, TNF  $\alpha$ , as through the diagnosis of the these cytokines secretion. Also the phagocytic cells can be diagnosis if the immune response is normal or more than it and that lead to immune disparity either increase or decrease, as for the second type including IL10, IL13. So its suppress the immune system response and prevent it cells functions to get migrate it cytokines with each other or stimulate it [8,9].

The pro – inflammatory cytokines send some different signals that regulate the inflammatory in addition stimulate the other cytokines so it will effect on the endocrine system and behavior as it work to stimulate the hypothalamus – pituitary adrenal axis (HPA) (Fig. 3). And it's mainly responsible for cortisol production. This cytokines could lead to some disorders in the behavior and some symptoms like fever, losing appetite[10].

## 7. Psychological factors and proinflammatory cytokines

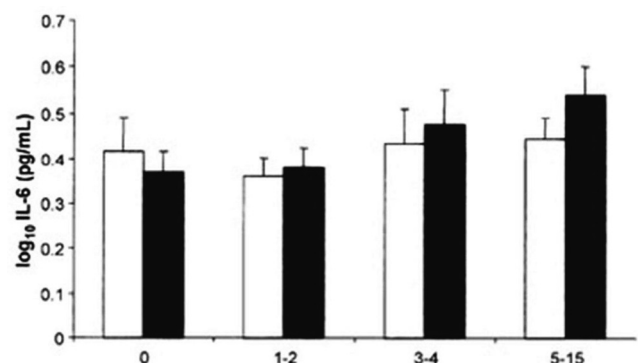
There are several health and social factors that associated to raise the proinflammatory cytokines unlike other ingredients that associated with age IL-6 that increase with getting old and it is also appears at high level in men compared with women [10]. Severe

depression is associated with enhanced levels of the proinflammatory cytokines including IL- 6 that could prevent the successful of the anti – depressant medications specially elder people, and many elder people that infected by COVID – 19 die due this reason [11]. Another study showed that people who have more symptoms of depression have high level of IL-6 after 2 weeks of the exposure there immune system to the virus vaccine, while there was a simple change to people who do not suffering from depression or have simple symptoms (Fig. 4). Also the IL-6 get increase as it related to the psychological stress. A study has shown that women who care for a close relative has Alzheimer disease have a higher level of IL-6, also it showed that the women who cared youngest about 6 to 9 years compared to other women in the other group [12].

For 119 samples for elderly people. The white lines represent the interleukin-6 levels before participants receive the influenza vaccine, and the black bars represent the level of interleukin-6 two weeks after receiving the vaccine. Symptoms of depression were also measured using the (BDI\_SF). Individuals with symptoms of depression show an increase in interleukin-6 two weeks after taking the vaccine compared to individuals who do not have depression or have mild symptoms. The lines at the top of the columns indicate the average number.

The stress caused by the HPA raises the level of hormones in the adrenal cortex including cortisol. So if the adrenal cortex hormones get disrupted as result of that it may prevent suppression of the immune system and hyper production of proinflammatory cytokines. Fig. 5 describe the pathway A disrupted the chronic stress and depression to transmit the adrenal cortex hormone signals in the brain by changing the role of the adrenal cortex receptors, while the B pathway describe the stress reduction of the tissues response that need cortisol [13].

Arrows indicate motivational paths, lines on the left indicate inhibitory paths, and dotted lines indicate ways to send signals. Chronic stress, depression and aging in this pattern contribute to elevating the stimulating cytokines of depression (interleukin-1, alpha necrosis factor and interleukin-6) in four ways: a / Psychological factors may contribute to impairing the functions of adrenal cortical hormones (such as cortisol) in the brain by reducing the number of receptors Adrenal cortical hormones in certain areas of the brain or impair the function of receptors, causing suppression of the adrenal pituitary adrenal axis (HPA). B / Psychological factors that may contribute to the blocking of adrenal cortical hormone receptors in cytokine-producing cells by making them less sensitive to the anti-inflammatory effect of cortisol. C / psychological factors that may result in weakening of the immune system. D / Anti-inflammatory cytokines may reduce the number of adrenocortical hormone receptors in the brain or disable their function. All of these methods may lead to an increase in the production



**Fig.4.** Interleukin-6 levels and their function in depressive symptoms.

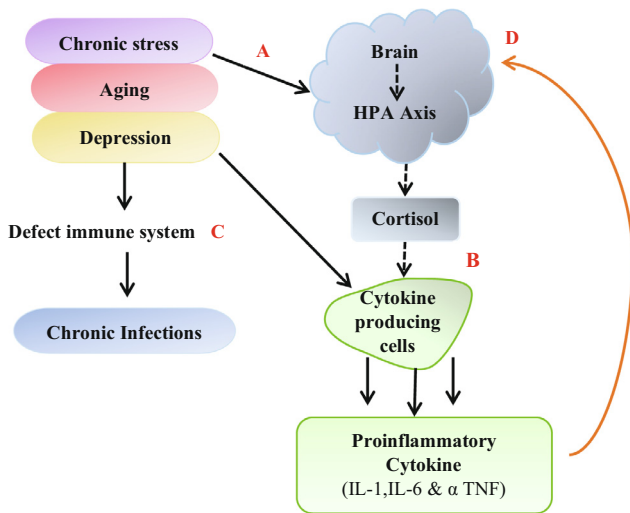


Fig.5. The extent to which psychological and aging factors influence immune suppression.

of anti-inflammatory cytokines, and over time, they may lead to chronic diseases and pathophysiology.

Also the psychological factors can associated in the enhancement production of proinflammatory cytokines to the stress that related to immune deficiency (Fig. 5 c). As the existing chronic stress impedes the response of the immune system against infection which increase the chance to get infected by infectious diseases and long time to get recovered. Physical and/or psychological stress associated with systemic disease may trigger

immune response system activation resulting in increased local and systemic release of proinflammatory cytokines. Increased levels of inflammatory mediators in the CNS are potentially important contributors to the harmful morphological and cellular adaptations that underlie the production of comorbid mental illness (Fig. 6) [14].

### 8. Elimination of anxiety

Every person feel anxiety from things happened in their lives and it's an automatic reactions because anxiety is a normal feelings but it must be within limits so immune system keep very efficient. The most highlights to eliminate from anxiety are [7]:

- Avoidance of continuity watching news and get enough with most recent developments.
- Avoidance of social media as much as possible.
- Keep simple exercises that help using time and enhance blood flow.
- Shower before sleeping as it work to relax the muscles and enhance the sleep.
- Take a plenty of fruits and warm drinks that eliminate the anxiety.

### 9. Conclusion

We notice that there are a lot of people suffering from frustration and grumbling as result of these fake and misleading news that posted on the social media which affected on their lifestyle greatly. And most of them can't different between the official sources and the none official that posted on social media that cause confuse and the intellectual and psychological confusion. also we notice an inverse relationship between psychological state of the people and the immunity, where it's supposed to confirmed the societal awareness between the individuals and reassurance these people by posts and honest news and reduce shocks. Also this research showed the appropriate mechanisms that through it enhance the chronic stress and depression to development of chronic diseases and how rapid to make the immune system weak to raise the proinflammatory cytokines.

### CRediT authorship contribution statement

**Saade Abdalkareem Jasim:** . : Conceptualization, Methodology.  
**Raed Obaid Saleh:** Visualization, Investigation, Supervision.  
**Yasameen Hasan Ali:** Writing - original draft, Software, Validation, Writing - review & editing.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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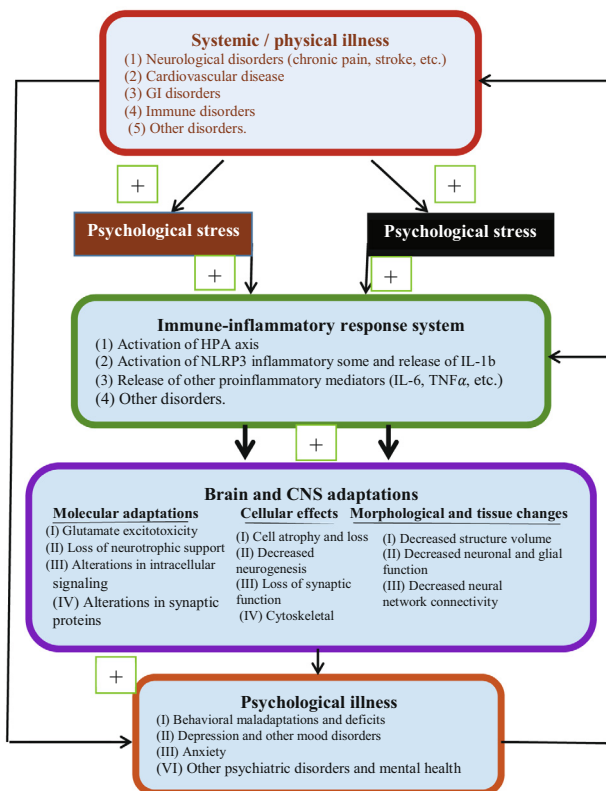


Fig.6. Bidirectional relationship between systemic illness and psychiatric disorders.



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