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The Principle of Treatment Staff Care of Children and Elderly Patients with Covid-19, Fracture and Multiple Trauma in ICU

# The Principle of Treatment Staff Care of Children and Elderly Patients with Covid-19, Fracture and Multiple Trauma in ICU

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## Abstract:

In this study, the principle of care of treatment staff for children and elderly with Covid-19, fractures and multiple traumas in ICU has been investigated. Considering the prevalence of trauma in society and its complications and costs, today trauma is considered one of the basic problems that threaten the health of society. Knowing the epidemiological information of patients can help in planning to reduce the health burden of this problem. Spine fracture is one of the severe injuries that can happen. In such a situation, the vertebra of the spine, which is rectangular in shape, will be compressed. This case is caused by severe traumas such as an accident or falling from a great height, but it can also be caused by osteoporosis and weakening of the bones in old age. One of the most common places where we see fractures is the middle and end of the spine. The severity of the trauma that caused the fracture indicates whether more damage has occurred.

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**Keywords:** Care of medical staff, Children and elderly, Covid-19, Fracture and trauma, ICU.

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### **Introduction:**

The prevalence of Covid-19 disease is almost the same between men and women; But the mortality rate of men is higher than that of women. The researchers conducted a review of the published articles on this topic [1-3]. Examining the data of the countries shows that the prevalence of the Covid-19 disease is almost the same between men and women; But the mortality rate of men is higher than that of women [4-6]. According to this issue, biotechnology researchers conducted a study and by reviewing the published articles in this field, they investigated the cause of the difference in the severity and mortality rate of the Covid-19 disease between women and men from the cellular, molecular, hormonal and immune points of view [7-9].

To conduct this study; Articles published during the years 2019 to 2021 were collected in databases and analyzed. In these studies, the effect of sex hormones on the immune system and the receptors necessary for virus entry, differences in the expression of cell receptors ACE2 and TMPRSS2 in both sexes, high smoking in men and escape from inactivation of the X chromosome as a factor in the difference in mortality rates in the two sexes. It is stated that they are effective [10-12].

The immune system responses to viral infections are different in men and women. The number and activity of some innate immune cells and inflammatory responses are higher in women than in men, and in general, women have a stronger innate and specific immune system than men. Also, the secretion of sex hormones creates differences between men and women. Until now, it has been established that testosterone has a suppressive effect on the immune system [13]. While estrogen has a strengthening effect on the immune system. High testosterone levels can increase the level of antibody responses. Also, high testosterone levels in men reduce antibody responses to vaccines. Another factor that causes the difference in the severity and mortality rate of Covid-19 between women and men is the presence of an extra X chromosome in women, which may affect the expression of the receptor affect ACE2. Another issue that is raised regarding the difference between men and women and its effect on the death rate caused by Covid-19 is the behavioral difference in smoking between the two sexes [14-16]. A study has shown that smoking can increase the expression of ACE2, which is the receptor of the Covid-19 virus, and this can increase the possible sites for the virus to enter [17].

For this reason, men who smoke are more vulnerable to the disease of Covid-19. The findings of this study indicate that due to the almost equal prevalence of Covid-19 disease between men and women, factors such as stronger immune system in women, higher estrogen in women than men, increased antibody responses in women compared to men, the protective role against inflammation

in women and... can be reasons for reducing the severity and mortality rate of the disease among women [18-20].

Although people of any age are susceptible to contracting the disease of Covid-19, according to the experience of SARS and MERS (Figure 1), which are similar to Covid-19, the possibility of severe infections, complications, disability and death is higher in the elderly. The US Centers for Disease Control and Prevention reported that although 17% of the total US population is older than 65 years, 31% of people with Covid-19, 45% of hospitalizations, 53% of people in intensive care units and 80% of deaths caused by this disease are seen in the elderly [21-23]. This suggests that the elderly is likely to be more at risk of contracting Covid-19 and experience worse outcomes. The present study was conducted with the aim of reviewing the condition of the elderly during the Covid-19 pandemic [24].

In this review study, an attempt was made to answer questions such as "Why is the Covid-19 disease more common in the elderly and does it have more complications?", "Why are the deaths and complications of Covid-19 higher in the elderly?", "Psychological problems caused by Covid-19 in the elderly." ", "The possibility of increasing the risk of misbehavior and age discrimination in the elderly during the outbreak of Covid-19", "Relationship of underlying diseases with Covid-19 in the elderly", "Comparison of the spread of Covid-19 with SARS, MERS and influenza in the elderly" and "How to care for the elderly During the outbreak of Covid-19" should be answered.

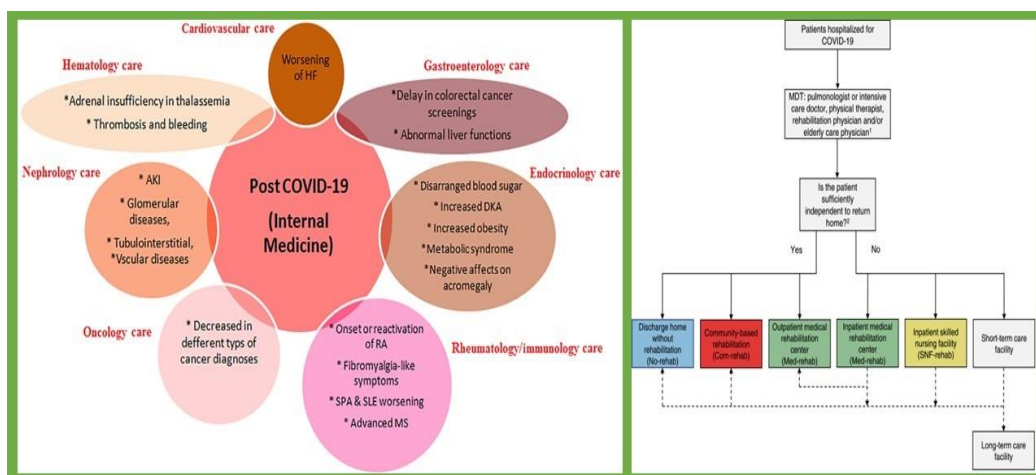


Figure 1. Dutch care pathways for hospitalized COVID-19 patients. MDT: multidisciplinary team.

**Background research:**

The current outbreak of Covid-19 can be one of the important factors involved in creating psychological reactions such as tension, anxiety and fear, which ultimately leads to psychological disorders such as post-traumatic stress disorder, depression and suicide. The current research was conducted with the aim of determining psychological disorders in nurses facing patients with

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Covid-19 in 2020. It seems that because the outbreak of Covid-19 was a biological disaster, insufficient knowledge about this disease and the high mortality and rapid spread of this disease put a high psychological pressure on nurses [25-27]. The results of this study showed that 21.3% of nurses who were in contact with patients with coronavirus suffered from post-traumatic stress disorder [28].

In the research conducted by Wang and his colleagues in June 2020 in China to measure nurses' PTSD, the results showed that nurses suffered from post-traumatic stress disorder when dealing with patients with Covid-19. The results of our study showed an increase in the anxiety of nurses in facing the corona virus. According to the study of Kang and his colleagues, in addition to the direct exposure to the Covid-19 disease in the work environment, which affects the mental health of medical workers, the illness of close friends or relatives also causes psychological damage to nurses. Our study also showed an increase in mental and psychological injuries in people with children and married people. In the research conducted by Liu and his colleagues in March 2020 in China, the high percentage of nurses' stress and anxiety was often due to their exposure to disease in the wards and providing services to patients. In our study, the results showed that 47% of nurses suffered from severe depression [29].

It seems that the reason for this is that nurses have more work than other medical staff. It is also possible that the mental health status of nurses in contact with corona patients is affected by the condition and problems of the patients. The study of Yanbufu and his colleagues showed that the Covid-19 epidemic caused emotional distress in 7.16% of the medical staff working in Xiatangshan Hospital. The amount of distress in men, married people with children, the elderly, doctors and employees was numerically higher, and in our study, with the mentioned characteristics, these people experienced more distress [30].

In this research, we found that PTSD decreases in nurses as their work experience increases. So that the increase in work experience resulted in a reduction of post-traumatic stress disorder by about 22%. It seems that increasing the experience and work records of nurses can have a positive effect on their mental health and reduce tension and post-traumatic stress disorder in nurses. In our study, increasing experience and decreasing post-traumatic stress disorder were inversely related.

In line with this finding, Kjølle et al. showed that fracture distance and age are significantly associated with the risk of sensory dysfunction [30]. In this study, all patients less than 30 years old, and 3 out of 8 patients who were more than 30 years old, completely recovered from the lower nerve disorder injury. Age and gender did not significantly affect lower nerve disorder. Most of the nerve injuries of the trigeminal region undergo spontaneous recovery; 96% of inferior alveolar nerve injuries and 87% of infraorbital nerve injuries recover within 4 to 8 weeks after surgery, and the rate of recovery is not affected by gender, and the effect of age is insignificant. Also, in this study, there was a relationship between suborbital nerve disorder and the amount of bone

displacement of the patients in examinations six months after surgery, but no significant relationship was observed in examinations before two weeks and three months after surgery [16].

In the study by Song et al., two hundred people (41%) had a displacement of 5 mm or more. In 38 fractures (13%), the condition of mental and alveolar sensory nerves worsened after treatment. Fixation with two mini plates, fracture displacement of 5 mm or more, and surgeon inexperience are associated with an increased risk of mental/alveolar sensory nerve damage after mandibular fracture treatment. Factors associated with alveolar nerve damage after surgery, including fracture damage and gap distance, are associated with an increased likelihood of sensory changes after treatment. In the sense that fracture distance and sensory disorders are related [19].

Peltomaa and Rihkanen as well as Kovacs and Ghahremani concluded that in zygomatic maxillary complex fractures with minor bone displacements, surgical intervention does not improve nerve function recovery, but on the contrary, sensory dysfunction will increase. Some researchers stated that if firm and inflexible fixation (mini-plate osteosynthesis) is used in the treatment of fractured zygomatic maxillary complex, better recovery of infraorbital nerve function will occur [40].

While in this research and similar findings, the prediction of infraorbital nerve regeneration and recovery after zygomatic maxillary complex fracture can be increased by reducing the opening and internal fixation. The findings of the research showed that there was a relationship between lower nerve disorder and the amount of bone displacement of the patients in examinations three months and six months after surgery [4].

The important point is that all the people with lower nerve sensory disorder whose displacement was less than 5 mm had completely recovered. In researches, cases with fracture displacement of less than 5 mm had higher neurological recovery scores compared to those with fracture displacement of more than 5 mm. Also, early management can reduce the possibility of permanent neurological impairment. Mandibular fracture displacement of 5 mm or more and the fracture site increases with the risk of sensory-neurological disorder of the inferior alveolar nerve after the injury. Two studies by Bede et al. and Boffano et al. showed that highly displaced fractures and comminuted fractures adjacent to the inferior alveolar nerve (angle, ramus, and body) with inferior alveolar nerve injury compared to after injury [22].

According to the results of this article, there was a relationship between suborbital nerve disorder and inferior alveolar nerve with the time interval of patients in examinations six months after surgery. Because nerve recovery may occur up to 2 years after injury, a longer follow-up time may provide a better estimate of the patient's final status. Kjølle et al. concluded that surgical intervention in a shorter period of time after the injury has a significant relationship with the reconstruction of nerve damage in the follow-up period of 1 and 6 months. The recovery rate of inferior alveolar nerve is reported between 33 and 100, which shows a high potential for recovery. Because nerve regeneration is slow, complete regeneration may occur even during the 12-month

follow-up period. A large variation in the rate of recovery and recovery of inferior alveolar nerve function has been reported according to different methods of evaluating nerve function. Inferior alveolar nerve damage can lead to a severe decrease in quality of life and chronic pain.

Yadav et al showed that the time interval of inferior alveolar nerve injury and the location of the injury play a role in the recovery of sensory neuron disorder. In fact, injury management in the first 24 hours is effective in faster recovery, and sensory-neural recovery is more observed in mandibular body fractures compared to mandibular knee fractures [3].

**Study method:**

The search strategy of this systematic review in 2020 to 2022 by searching international internet search databases in the scientific search engine Google Scholar and Magiran, PubMed, Science Direct, Scopus, Syed and Cochrane Library databases using the keywords Covid-19, corona, elderly and Covid-19, older adult, ageism, social isolation, elder abuse, psychological problems were done. Boolean Operator (AND, OR) was used for searching the combination without time limit. The search strategy was limited to Persian and English articles. All search results, including titles and abstracts, were entered into Endnote x8.1 software. Original articles published in peer review journals were included in the study. Articles whose full text was available were also included in the study. Letters, commentaries, gray literature and articles presented in seminars and conferences were excluded from the study.

**Search results:**

In the first stage, 310 articles were entered into Endnote, and after removing duplicate articles, 218 articles remained for abstract and title review. If there is any ambiguity in the abstract or the title, the full text of the article was downloaded and checked by two of the authors. Finally, based on the inclusion and exclusion criteria, the remaining 112 articles were included in the study, and the full text of the articles was reviewed with the help of three authors (a master's student in geriatric nursing, a master's student in audiology, and a nursing expert) (Figure 2).

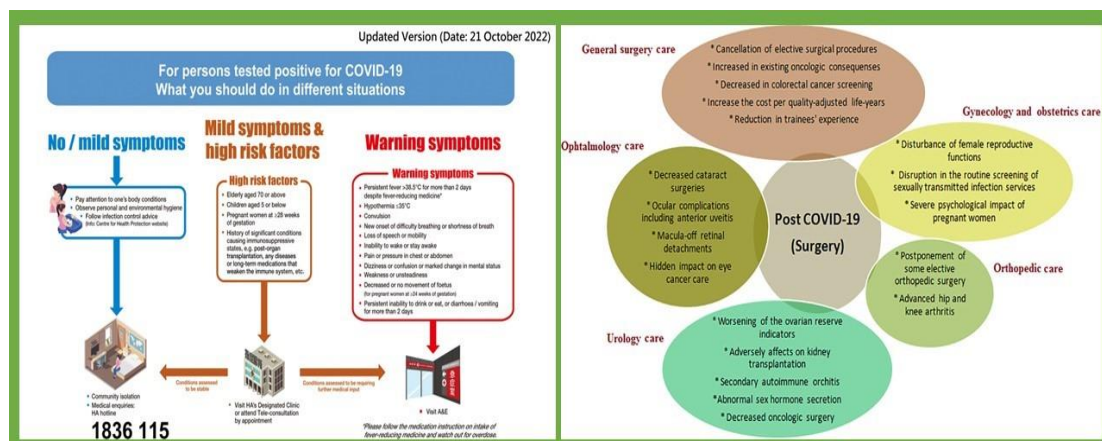


Figure 2. The consequences of COVID-19 on surgery care after the pandemic

**Findings:**

Why is Covid-19 more common in the elderly and has more complications? It is usually difficult to identify and manage infections in the elderly. Factors that can cause poor health outcomes in the elderly include physiological changes of aging, chronic diseases such as cardiopulmonary diseases, diabetes, dementia, and concurrent use of various medications. Respiratory diseases usually have a U-shaped mortality curve, and deaths in children and the elderly are higher than in other ages, but this is not the case in the case of Covid-19, and the death rate in the elderly increases, but children are less prone to death. This raises questions about the cellular and molecular mechanisms associated with the exacerbation of the disease of Covid-19 in the elderly. Understanding such mechanisms may help us better manage disease in the elderly. Here we will examine three theories about the cause of the exacerbation of Corona in the elderly:

**Covid-19 and angiotensin-2 inhibitory enzyme:**

Coronaviruses use their S protein to enter host cells. In humans, for SARS-CoV-1 and SARS-CoV-2, this entry occurs through the angiotensin-converting enzyme 2 (ACE-2) receptor located on the surface of host cells. Angiotensin 2 converting enzyme receptor is present in lung, heart, endothelium, kidney and digestive system. After the virus binds to ACE-2, the virus releases its genetic material to replicate in the host's cytoplasm. Since the renin-angiotensin system controls blood pressure and kidney function, ACE inhibitors and angiotensin receptor blockers are widely used in heart diseases such as they are used for high blood pressure, coronary artery disease, heart failure and myocardial infarction, and in the elderly with cardiovascular diseases, diabetes and kidney failure. The results of studies have shown that intravenous injection of ACEI and ARB in laboratory animals increases the number of ACE-2 receptors in the cardiopulmonary system.

As a result, it is assumed that in patients who use ACEI or ARB chronically, the number of ACE-2 receptors in their cardiopulmonary system increases. Patients treated with ACEIs and ARBS have more ACE-2 receptors in their cardiopulmonary system to bind the Corona S protein and can be at risk of severe consequences of Covid-19 disease. As a result, the elderly, who often have cardiovascular diseases, high blood pressure, diabetes, and chronic kidney diseases, take more ACEI or ARB drugs than other people, and they are more prone to complications and mortality when infected with Covid-19 than children.

On the other hand, some believe that the use of ACEIs and ARBS can be beneficial for patients with Covid-19. Based on this hypothesis, the use of ACEIs and ARBS can upregulate ACE-2 and convert angiotensin II to angiotensin, which may protect the lungs from acute injury. In the lungs, angiotensin I is converted to angiotensin II [16].

Angiotensin II then either binds to the AT1 receptor, which causes vasoconstriction, high blood pressure, and inflammation, or binds to the AT4 receptor and converts to angiotensin, causing thrombosis. The role of ACE-2 is to inactivate angiotensin II by converting it to angiotensin, which

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binds to Mas receptors and causes vasodilation and hypotension. Therefore, in a healthy individual, ACE-2 negatively regulates the renin-angiotensin system and reduces the resulting vasoconstriction, fibrosis, and hypertrophy.

When the spike protein of SARS-CoV-2 binds to ACE-2, it leads to internalization of the complex and destruction of ACE-2 by ADAM17 enzyme. Reducing the availability of ACE-2 reduces the degradation of angiotensin II. Excessive amounts of angiotensin II by binding to AT1 and AT4 receptors lead to the abnormalities seen in Covid-19, namely acute lung injury with localized vasoconstriction that facilitates ARDS, myocardial injury, and thrombosis. The use of ACEIs and ARBS may cause upregulation of ACE-2 and increase its amount after viral attachment. ACEIs cause less synthesis of angiotensin II and ARBs prevent the binding of angiotensin II to the AT1 receptor, as a result, the stimulation of the AT1 receptor is less and the continuous interaction with ACE-2 is increased and the internalization of ACE-2 is prevented. The increase of ACE-2 causes the breakdown of angiotensin II to angiotensin (7-1), as a result of the stimulation of AT1 and AT4 receptors and the negative consequences caused by the stimulation of these receptors (increased blood pressure and inflammation, venous thrombosis, acute lung damage, myocardial damage) are less [7].

### **Discuss:**

Currently, the world is suffering from the epidemic disease of Covid-19 with the new corona virus SARS-CoV-2, which was observed at the end of 2019 in the city of Wuhan, located in the province of Hubei, China. The reported symptoms of Covid-19 are primarily respiratory symptoms with acute respiratory distress syndrome, which ultimately leads to the death of the patient in the most severe cases. However, Covid-19 has also been shown to affect other organs, including the brain, and there have been recent reports of neurological symptoms caused by infection with the virus.

There are indications of neurotropic properties of SARS-CoV-2. However, little is known about the exact mechanisms of how it affects brain function. According to previous studies in the field of SARS or Ebola epidemic diseases, the occurrence of a sudden and immediately life-threatening disease can create extraordinary pressures on medical staff. Increased workload, physical exhaustion, inadequate personal equipment, patient transfers, and the need to make difficult ethical decisions regarding rationing of care may have significant effects on their physical and mental well-being. Their resilience can be compromised by isolation and loss of social support, danger or infection from friends and loved ones, as well as drastic, often disturbing, changes in the way work is done [8].

Therefore, medical staff are particularly vulnerable to mental health problems, including fear, anxiety, depression and insomnia. A person's anxiety, stress and mental worries are among the mental health disorders that exist in all diseases and biological disorders due to the community's view of the sick person. According to such conditions, the increase in the length of stay at home,



the level of stress, anxiety and depression is expected; Because quarantine may bring the risk of creating or aggravating such mental problems.

Also, people with chronic diseases are expected to present a higher level of mental disorders. Due to their job position, hospital administrative staff are in daily contact with a number of clients, and as a result, it is important to increase the level of stress and anxiety in these people. Establishing clear communication, limiting shift hours, providing rest areas, as well as wide access and strict rules regarding the use and management of protective equipment and specialized training for Covid-19 patients can reduce anxiety caused by the perceived unfamiliarity and uncontrollability of risks. The results of a study conducted by Zhou et al to investigate the level of knowledge and attitude of medical staff in the outbreak of the new coronavirus, showed that 89% of all people examined in this study had sufficient knowledge about Covid-19. In this study, doctors obtained higher attitude scores than nurses. The results of Shi et al.'s study entitled Knowledge and Attitude of Medical Staff of Psychiatric Hospitals in China regarding Covid-19 showed that during the epidemic of Covid-19, 51.89% of the medical staff of the studied psychiatric hospitals had extensive knowledge of Covid-19 and 63.64% of them. They have experienced relevant training in hospitals.

Considering the mentioned cases and the higher risks of disease in the administrative staff who are closely related to the treatment staff, examining the situation of the administrative staff who are considered very important and key forces in advancing the goals of each hospital, in terms of ensuring their health and individual functioning in the organization of a hospital is essential and will allow us to carefully plan their working conditions and, if necessary, develop suitable training programs. Therefore, the purpose of this study was to compare the level of awareness, attitude and performance of medical and administrative staff in exposure and non-exposure to the Covid-19 virus (Figure 3 & 4).

As a pandemic disease, Covid-19 has so far claimed the lives of many people around the world and put a lot of pressure on the health care system of the countries involved and the health care personnel. This study was conducted with the aim of explaining the elements and dimensions of nurses' safety experience in dealing with Covid-19 patients based on the views of nurses and nursing managers. During the corona era, nursing students are always in contact with carriers or sufferers of Covid-19. The corona pandemic and its consequences can lead to a wide range of emotions and emotional reactions in nursing students. Manpower management is an important part of the emergency plan against important events such as the outbreak of an infectious disease. The correct employment of nurses is necessary to ensure the continuity of work and to guarantee sufficient manpower in response to the increase in demand for human resources. In a study conducted by Zhou et al to investigate the level of awareness and attitude of medical staff in the outbreak of the new coronavirus, almost half of the respondents (46.5%) were nurses and 36.5% were doctors. The results of this study showed that 89% had enough knowledge about Covid-19.

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In this study, doctors obtained higher knowledge scores than nurses. More than 85% of these people were afraid of being infected with the virus, and 7.89% of them followed the correct methods of preventing Covid-19. In addition to the level of knowledge, some risk factors such as work experience and job issues affected the attitude and performance of these employees regarding Covid-19.

Raw	Study	Year	Severe COVID-19	non- Severe COVID-19		Proportion Wight 98%	Weight %	
1	Ibrahim et al.	2020				0.92	[0.39 – 1.06]	5.03
2	Jiahua et al.	2020				0.87	[0.54 – 1.02]	6.02
3	Kalantari et al.	2020				0.88	[0.63 – 1.01]	5.57
4	Karampela et al.	2019				0.60	[0.25 – 1.08]	6.13
Heterogeneity $t^2=0.02, I^2= 0.00, H^2=1.02$							0.95	[0.22 – 1.07]
Test of $\Theta= \Theta, Q (4) =5.55, P= 0.74$								
1	Cottam et al.	2014				0.84	[0.27 – 1.08]	6.08
2	Crisan et al.	200				0.76	[0.52 – 0.22]	5.82
3	Helmy et al.	2020				0.11	[0.54 – 0.89]	5.85
4	Hosseini et al.	2008				0.39	[0.12 – 0.99]	6.09
Heterogeneity $t^2=0.14, I^2= 0.11, H^2=0.42$							0.77	[0.19 – 1.00]
Test of $\Theta= \Theta, Q (4) =3.35, P= 0.34$								
1	Abbasi et al.	2018				0.92	[0.39 – 1.06]	3.03
2	Beachboard et al.	2015				0.87	[0.54 – 1.02]	8.33
3	Beigel et al.	2020				0.99	[0.63 – 1.01]	7.50
4	Borba et al.	2020				0.68	[0.25 – 1.08]	6.03
Heterogeneity $t^2=0.14, I^2= 0.00, H^2=1.02$							0.87	[0.22 – 1.07]
Test of $\Theta= \Theta, Q (4) =3.55, P= 0.12$								

Figure 3. The Principle of Treatment Staff Care of Elderly Patients with Covid-19, Fracture and Multiple Trauma in ICU

In Shi et al.'s study, which was conducted in order to evaluate the knowledge and attitude of medical staff of psychiatric hospitals in China regarding Covid-19, 141 psychiatrists and 170 psychiatric nurses participated through an online designed questionnaire. The results of this study determined that during the Covid-19 epidemic, 51.89% of the medical staff of the studied psychiatric hospitals had extensive knowledge of Covid-19 and 63.64% of them had experienced relevant training in the hospitals [58].

Raw	Study	Year					Proportion Wight 98%	Weight %		
1	Rotunno et al.,	2014					0.24	[0.13 – 1.13]	1.6	
2	Okamoto et al.,	2014					0.32	[0.22 – 1.11]	1.3	
3	Sabol et al.,	2014					0.66	[0.34 – 1.2]	2.3	
4	Sorensen et al.,	2014					0.45	[0.35 – 0.98]	2.3	
<b>Heterogeneity <math>I^2=0.21</math>, <math>I^2= 0.13</math>, <math>H^2=0.82</math></b>								0.65	[0.54 – 0.77]	1.4
<b>Test of <math>\Theta= \Theta</math>, Q (4) =1.05, P= 0.57</b>										
1	Gallegos-Suarez et al.	2015					0.16	[0.11 – 0.66]	1.15	
2	Kim et al.	2015					0.56	[0.15 – 0.48]	1.32	
3	Asadi et al.	2020					0.58	[0.29 – 0.55]	2.21	
4	Azizi et al.	2020					0.64	[0.27 – 0.39]	2.23	
<b>Heterogeneity <math>I^2=0.12</math>, <math>I^2= 0.06</math>, <math>H^2=0.11</math></b>								0.82	[0.13 – 0.32]	1.19
<b>Test of <math>\Theta= \Theta</math>, Q (4) =1.51, P= 0.05</b>										

**Figure 4.** The Principle of Treatment Staff Care of Children Patients with Covid-19, Fracture and Multiple Trauma in ICU

In addition, about 17.77% of the participants expressed their willingness to take care of mental patients infected with the Covid-19 virus. Kamat et al. conducted a multinational study with the aim of evaluating the knowledge, attitude and practice of dentists regarding the Covid-19 pandemic. High scores of knowledge and good performance were observed among 7.92% and 5.79% of dentists, respectively.

As a result, it was found that dentists have good knowledge and grades, which is necessary to fight against Covid-19. The results of Saklaina et al.'s study, which was conducted with the aim of investigating the knowledge, attitude, performance, and perceived barriers among health care professionals (HCP) regarding Covid-19, showed that health care professionals have good knowledge (2.93%, 386 people). have a positive attitude and good performance (7.88%, 367 people) [13].

#### Immune aging and the cytokine storm:

With age, the immune system undergoes many changes, which is called immune aging. These changes affect many cellular and molecular elements of both the innate and acquired immune systems as well as their coordination in response to infections and make the elderly particularly vulnerable to new and emerging infectious diseases. Immune aging, which is characterized by a decrease in the ability to create an adequate immune response against infection and a susceptibility to a pro-inflammatory disease, is one of the main factors in the vulnerability of the elderly to the Covid-19 virus. This phenomenon is a very complex process. In short, in old age, the production of immature T and B cells decreases and the function of innate immune cells is impaired. On the other hand, the lymph nodes, which are responsible for maintaining immature T and B cells and coordinating new immune responses to control viruses such as Covid-19, in one third at the end of life, they undergo dramatic changes related to aging and are less able to maintain immature T cells and coordinate immune responses against new infections [3].

Hence, the cells involved in innate immunity are not effectively activated during infection, and the development of the acquired immune response does not occur in a coordinated manner. These changes reduce the effect of viral clearance and increase the possibility of irregular immune response, the release of cytokines by activated immune cells, and as a result, the activation of cytokine storm in the body. Excessive release of pro-inflammatory cytokines, described as cytokine storm, appears to be a major pathophysiological mechanism in elderly patients with Covid-19. Although the exact underlying mechanism of cytokine storm in elderly adults with severe Covid-19 infection is not entirely clear, however. Dysregulation of cytokine homeostasis may play a major role in the risk of cytokine storm and subsequent acute respiratory distress syndrome, tissue damage, immune cell death, and respiratory tract damage in some elderly patients with severe Covid-19 infection.

In general, it seems that there is a balance between pro-inflammatory cytokine networks and anti-inflammatory cytokines in the body of young people, so their immune system can limit the progress of the Covid-19 infection, but elderly patients do not have the same balanced immune response as young people, and it seems that their immune system is a Maintains mild inflammation. Thus, activation of the body with pathogens, such as a Covid-19 infection, can exaggeratedly increase the range of the immune response, known as a cytokine storm.

#### **Antibody-dependent enhancement:**

Antibody-dependent enhancement is a phenomenon in which viruses use the antibodies produced by previous exposure to these viruses and enter the cell by binding to the FC receptor of the host cell. In fact, the antibodies that were created as a result of the first exposure to the virus, in the second exposure, instead of fighting the virus and destroying it, facilitate the entry of the virus into the cell or increase the proliferation of the cell, both of which increase the virus load in the host. In the case of the corona virus, considering that these viruses are very common in the world and can cause diseases ranging from the common cold to SARS, there is a possibility of an antibody-dependent strengthening phenomenon.

#### **How are the mortality and complications of Covid-19 in the elderly?**

Although this disease affects people of all ages, according to the World Health Organization, two groups are at greater risk and the severity and complications of the disease will be greater in these two groups. These two groups include people over sixty years old and people with underlying diseases. Epidemiological analyzes of the Covid-19 disease have shown that there are many risk factors and complications for this disease, but it is safe to say that the most important influencing factor is age. According to a study conducted in China, the mortality rate of this disease was 1.0% in children and 8.14% in the elderly. In the study conducted in America, the death rate increased with increasing age; In this way, the mortality rate was 3-5% in the elderly 65-74 years old, 4-11% in the elderly 75-84 years old, and 10-27% in the elderly 80 years old and above. This study

showed that 31% of cases, 45% of hospitalizations, 53% of hospitalizations in special departments, and 80% of deaths occur in people over 65 years of age, and many severe complications of the disease are seen in the elderly 85 years and older. According to the results of a study on 72,314 people, the mortality rate was 3.2% in all ages, 8% in the elderly aged 70 to 79 years, and 14.5% in the elderly over 80 years old. On the other hand, the possibility of chronic diseases increases in the elderly, which can increase the mortality rate and complications caused by this disease. In a study conducted on patients with Covid-19, the death rate of people without comorbidities was 4.1%, while it was 2.9% for people with cardiovascular diseases, 4.8% for people with high blood pressure, 4.8% for people with it was 8% for chronic respiratory diseases and 7% for people with cancer. The mortality rate in the elderly increases even without pulmonary involvement, and this can be due to nonspecific organ failure in the elderly. In the elderly, the duration of hospitalization and the recovery of clinical symptoms are longer, the disease progresses faster, the mortality rate, lung involvement and the need to use a mechanical ventilation device also increase.

### **Covid-19 and underlying diseases**

Although several months have passed since the beginning of the spread of the Covid-19 virus, our information about this disease and its related risk factors is still limited. Preliminary data from China show that 32% of patients with Covid-19 have underlying diseases including cardiovascular diseases, high blood pressure, diabetes and chronic obstructive pulmonary disease. Studies conducted in different countries indicate that obesity and chronic diseases such as type 2 diabetes, high blood pressure, cardiovascular diseases, chronic obstructive pulmonary disease, kidney diseases, liver diseases, and malignancies increase the risk of worsening the disease of Covid-19, hospitalization, it increases the transfer to the intensive care unit and the use of mechanical ventilation.

In the systematic review of Kalpana Bajgin et al., which included a total of 27 articles and was conducted on 22,753 patients with Covid-19 in the main centers of this disease around the world, the most common chronic diseases include hypertension (4.27%), diabetes (4.17%), cardiovascular diseases (9.8 %), chronic obstructive pulmonary disease (5.7 %), cancer (5.3 %), chronic kidney diseases (6.2 %) and other cases (5.15 %). The most common chronic diseases in different countries that were seen with the Covid-19 disease.

Including high blood pressure in China (5.39%), Italy (9.35%), America (9.38%) and England (8.27%), cardiovascular diseases in South Korea (25.6%); diabetes in Iran (35%) and other diseases in Mexico (3.42%). The data of 180 patients hospitalized in the United States showed that almost half of them (3.48%) were obese, 49.7% had high blood pressure, 3.28% had diabetes mellitus type 2, and 27.8% had diabetes. They are related to cardiovascular disease. The study conducted on 856 patients hospitalized with the diagnosis of Covid-19 from January 17 to February 7, 2020

in Zhejiang province indicated that 242 (3.28%) of the patients had underlying diseases and 152 of them (8.17%) had two or more diseases. The most common disease was high blood pressure (6.16%), followed by diabetes (7.5%). Out of 856 patients, 154 cases (18%) had severe disease symptoms and 32 (3.7%) of them had severe consequences (admission to the intensive care unit, shock or death), of which 22 were people who had an or they had some underlying diseases. In general, combined data show that people with chronic underlying disease may experience several times more severe complications compared to other people.

### **What are the psychological problems caused by Covid-19 in the elderly?**

The Covid-19 disease has affected all aspects of human life, including psychological issues. After the results of studies showed that the elderly is at greater risk from the virus, the World Health Organization and governments advised the elderly to stay at home, practice social distancing and avoid visiting friends and family to prevent infection. While the isolation of the elderly is necessary for their physical safety, its implementation without the necessary supervision, management and support will increase loneliness, worsen the mental state, endanger the independence of the elderly and affect their overall health. Undoubtedly, staying away from the community and self-quarantine at home is an unpleasant experience for everyone, especially the elderly, and causes stress in this group. In this situation, they may feel rejected and forgotten by others. These conditions worsen the condition of the elderly who have already suffered from social isolation or cognitive disorders such as Alzheimer's and dementia, and may cause or intensify anxiety, fear, restlessness and stress in them. This situation is worse for the elderly who live alone at home and their only contact with people outside the home is when they go to medical centers, parks, shopping centers and religious places.

Social isolation caused by quarantine can cause many consequences in the field of mental health of the elderly, including acute stress disorders, irritability, insomnia, distress, mood disorders such as depression, fear and panic, anxiety and stress caused by financial issues, frustration, loneliness, lack of facilities, and weak communication. The longer the quarantine period lasts, the psychological consequences will increase, and the elderly will have more problems in getting the items they need, such as food and medicine, and performing their daily activities. In this situation, to manage the social isolation of the elderly, there is a need for their emotional support through informal caregivers (family, relatives and friends) and government centers.

How to maintain and promote mental health through self-care through the media, as well as information about the disease, its ways of spreading, and ways to reduce the risk of infection should be provided to the elderly. This information should be repeated whenever necessary in simple language and concise manner, respectfully and patiently. The needs of the elderly, including food and medicine, should be provided through families, governments and voluntary centers. Although not all the elderly may have access to the Internet and smart phones or have the ability to use it, this technology can be used to communicate with the elderly to limit the effects of social isolation.

Mistreatment of the elderly is an important global issue and has serious consequences. The global prevalence of misbehavior in the elderly living in the community last year was about 15.7%. According to the definition of the World Health Organization, elder abuse is: "A single or repeated act, or lack of appropriate action, in a relationship where there is an expectation of trust that causes harm or distress to the elderly." Types of elder abuse include abuse It is physical, mental, financial, sexual and neglect. With the spread of the Covid-19 disease, it was recommended that high-risk groups, especially the elderly, quarantine themselves and stay at home to prevent contracting the disease. Although this is necessary for their physical health, it will undoubtedly increase social isolation and its consequences in the elderly.

Staying at home is not always safe, and for some seniors who have already been victims of abuse and domestic violence, it means increased physical, psychological, and sexual abuse. Quarantine of the elderly may mean severe restrictions, inability to ask for help and closing escape routes for the elderly. Unfortunately, quarantining the elderly at home allows caregivers with a history of abuse to freely commit abuse without any supervision or consequences. The elderly is very vulnerable during the outbreak of the Covid-19 disease, and this increases the level of anxiety and stress caused by it in the elderly, on the other hand, they have to stay at home to prevent the spread of the disease. As a result, they depend on others to do many daily tasks. Mistreatment of the elderly is more common in societies where both the victim and the perpetrator of the misbehavior are limited in receiving support services and treating mental health problems. The quarantine of the elderly has increased the demand for essential services, and the elderly have difficulty accessing these services.

Restrictions in accessing services and care have made the elderly less likely to report misbehavior and the occurrence of misbehavior seems normal to them. People with cognitive disorders and far from family are at greater risk. At this time, with the increase of digital exchanges, the possibility of financial misbehavior of the elderly by strangers also increases. Limitation in communication with the elderly makes their caregivers unable to do their job well and put under more pressure. Also, the possibility of misbehavior being detected by other people decreases. Elderly people suffering from chronic diseases will have problems in going to medical centers and their health will be endangered.

In this era, due to the fear of visiting medical centers and stress, the burden of caring for the elderly also increases for caregivers. On the other hand, many caregivers may experience a lack of time and stress due to the closure of schools and child care, taking care of other family members who have fallen ill, or due to increased working hours (for people who work in medical and service centers). As a result, the use of drugs and alcohol may increase to reduce anxiety, and naturally, the amount of misbehavior will also increase.

Many caregivers may refuse to contact and care for the elderly due to the fear of being a carrier, which causes neglect in caring for the elderly. Unfortunately, in many cases, elderly people who are mistreated, in order to preserve the dignity of the family, refuse to express them to others, and many times they are embarrassed to express them. In this situation, support organizations and health care providers should monitor and provide their services more to minimize the occurrence of misbehavior. One of the ways to reduce the risk of elder abuse is to maintain communication with them by family and friends or health care providers. Frequent voice and video calls can greatly help these people to reduce the amount of social isolation in these people and meet the health, food, and medical needs of the elderly in this way. For this purpose, a person or an organization must be specified for each elderly person to meet the needs of the elderly. Strong penalties should be imposed on those who misbehave to act as a deterrent. Caring for people with cognitive disorders is very difficult, and the careers of these people should be supported and taught how to care for these people.

### **Covid-19 and age discrimination in the elderly**

Age discrimination means stereotyping, prejudice and discrimination between people based on their age. The results of studies have shown that the prevalence of age discrimination among the elderly is increasing, and with the increase in the world's elderly population, age discrimination will increase even more. Age discrimination in the elderly is a great threat to active aging and will cause negative consequences in memory and cognitive function, health, job performance and even their life expectancy. With the increase in the prevalence of Covid-19, the prevalence of age discrimination in the elderly is also increasing. What is seen in the public debate is the increasing view that the elderly is helpless and weak in the face of the disease and are unable to participate in society, and this view is propagated by social media, the press and government statements around the world.

When this happens and we expose the elderly as susceptible to the disease, it causes other people to think they are safe from the disease and engage in risky behavior, spreading the disease. On the other hand, it causes young people to direct their anger and dissatisfaction towards the existing conditions towards the elderly. Another case of age discrimination is the discussion of people's mortality. In the case of the elderly, it is easy to talk about death, so that it is not considered something significant, but in a way, the death of young people is talked about, as if their lives have more value than the elderly.

This issue makes the elderly feel that their life is worthless and unimportant. In addition, because they mistakenly consider this disease as a disease of the elderly, many countries have decided to impose strict restrictions on the elderly and advised them to stay at home and self-quarantine. These restrictions intensify social isolation and the negative consequences that result from it. Another example of age discrimination against the elderly is the lack of hospital beds and facilities. With the lack of hospital beds, especially in special departments, the question arises, who is the



priority? In this situation where there is a clear framework for decision-making, many people may recommend that the facilities be given to people who are younger. Many believe that because younger people have a higher life expectancy, they should be prioritized. The elderly should also have a long-life expectancy, and on the other hand, based on ethical rules, decisions in this situation should be made regardless of age, gender, and ethnicity.

The elderly is the most heterogeneous group in society, and their physical and psychological performance is highly variable. In other words, chronological age is a very weak guide for accurately predicting behavior, performance, needs, disability, and illness in this age group, so chronological age is by no means a suitable criterion for triaging and allocating resources and facilities to people. The elderly in the society is the most experienced group and most of the time they do what is reasonable and based on the needs of the society and we should refrain from paternalistic behavior towards the elderly and we should not tell them what to do and what not to do. Therefore, it is unnecessary and discriminatory for us to force the elderly to observe social distance and quarantine only based on their age. In this situation, instead of limiting them, their experiences can be used to control the existing conditions. The thing that should be considered in this case is that we should not divide the society in terms of age and build a wall between the elderly and other people. In times of resource scarcity, intragroup differences are likely to increase, but the current situation is precisely the time when age and intergenerational solidarity must increase in order to overcome these difficult conditions.

### **Comparison of Covid-19 with SARS, MERS and influenza in the elderly**

Currently, according to the information of the World Health Organization, the death rate of Covid-19 is about 4%, and it is much lower than the death rate of SARS disease (6.9%) and the death rate of MERS (5.34%). Although the severity of MERS and SARS disease was higher than the disease of Covid-19, due to its higher contagion power and its spread throughout the world, the number of deaths caused by the disease of Covid-19 was higher, especially in the elderly. According to the estimate of the World Health Organization, the transmission of the Covid-19 virus is about 2 to 5.2, but in SARS this number is 7.1 to 9.1 and in MERS this number is less than 1. The disease of Covid-19, like MERS, is mainly in elderly people with serious underlying disease and death.

While SARS was more common in healthy young people, the incidence of mortality and complications increased with age in all three diseases. In MERS disease, compared to SARS and Covid-19, the severity of the disease and the need to use a mechanical ventilation device in the elderly were higher. A key difference between Covid-19 and pandemic influenza is the age distribution of patients who are critically ill. The mortality rate in people infected with Covid-19 increases sharply with age, and fatal outcomes are almost exclusively seen in people over 50 years of age. Most people with H1N1 flu were younger than 60 years old, while most hospitalized people with Covid-19 are over 60 years old. The death rate of the elderly in Covid-19 was much higher

than that seen in the pandemic flu. During the outbreak of the Spanish flu in 1918, the highest death rate was seen in people aged 15 to 44 years, and in the H1N1 flu, the highest death rate was seen in people between the ages of 5 and 59, while the death rate caused by Covid-19 is seen more in the elderly.

### Caring for the elderly in the era of Covid-19

By being aware of the special needs of the elderly during the Covid-19 disease and being sensitive to their vulnerability, they can be helped in this difficult situation. During the outbreak of this disease, there is a need to publish new and correct information. Much of this information is published online, but older people may have limited access to these technologies. Therefore, it is very important that information is available to them through the media, newspapers and magazines. Many seniors may not be familiar with the complex medical terms and statistics of this disease, but it is their right to be informed of important information. For this reason, information should be provided to them in simple and understandable language.

Our duty, especially the statesmen and politicians, is to avoid spreading false information that causes fear and anxiety in them. Appropriate guidelines on Covid-19 and care of the elderly have been published by the World Health Organization, the US Centers for Disease Control and Prevention, etc., and these resources can be used to guide and care for the elderly. Isolation and quarantine of the elderly at home may aggravate their psychological problems. For this reason, they should always be supported psychologically and emotionally, and their relationship with family and relatives should be maintained, not necessarily physically, but with frequent voice and video calls.

Regular video and voice calls with these people can keep hope and happiness alive in the elderly. For the elderly who live alone. In this situation, access to food, medicine, etc. may be limited, so these people should be supported in meeting their daily needs. Also, special support and attention should be given to the elderly who have disabilities. For these people, maintaining social distance and using gloves and masks can be extremely limiting and reduce their ability to communicate. Using gloves is very disabling for the elderly who have vision problems and need touch to read, write and identify the environment.

In order to meet the needs of these people, family, friends, relatives and health care workers must make home visits. Due to the vulnerability of the elderly to this disease, it is better for them not to leave the house as much as possible and not meet many people. Health issues and prevention tips should be taught to them and important tips should be provided to them in simple language. This information should be repeated for them as much as necessary, and written and audio instructions should be provided to them. Unnecessary visits to medical centers should be avoided and unnecessary surgeries such as cataract, hernia, etc. should be postponed. Medical centers, doctors and psychiatrists, etc. should activate their telephone and digital visits and the necessary guidance

and how to access these services should be provided to the elderly by family, relatives, friends and health care workers.

Family members should be sensitive to the symptoms of this disease in the elderly, and if necessary, the necessary tests should be performed, but this should not increase self-isolation in them. Medical equipment is the best tool for screening symptoms in them. You should not use certain drugs for the prevention and treatment of Covid-19 in the elderly without a doctor's prescription, because the use of these drugs may be dangerous and fatal. For the elderly who live alone, centers that provide essential services such as food, medicine and other equipment are very important. The provision of these services should be increased as much as possible, and the contact numbers and necessary information about how to provide the services and the services that are provided should be provided to the elderly.

Psychological issues are very important and families should be sensitive to them. It is normal for people to be stressed in these conditions, but excessive fear, depression, sleep problems and suicidal thoughts require immediate attention and referral to a psychiatrist. Even in times of crisis, the elderly are the best people to participate in decision-making. In this situation, their self-esteem, rights and respect should be protected and supported and their decisions should be respected. Special services should be provided for vulnerable elderly people such as refugees, immigrants, sexual minorities, displaced people, racial, ethnic, religious and tribal minorities, people with disabilities, people with dementia, people living in nursing homes and economically weak elderly people. In order to improve their welfare conditions, it should be considered. The risk of infection is higher for the elderly who live in nursing homes and aged care facilities.

To reduce the risk of infection in these centers, the following measures should be taken: People who work as caregivers in these centers should be aware of the symptoms of this disease and regularly check the symptoms of the elderly in order to take the necessary measures immediately. In the elderly, due to the presence of chronic diseases, it may be difficult to identify the symptoms of the disease. In this case, any change in the patient's conditions and symptoms compared to before should be considered a danger sign for Covid-19. The employees of these centers should be screened for symptoms of the disease on a daily basis, and if symptoms are observed, they should be quarantined and their presence at the workplace should be avoided.

Meetings should be held in a limited way, observing health tips. The distance between people should be at least 1 to 2 meters. It is better to close all group activities in these centers for now. Caregivers of these people should always be ready to take the necessary measures if an elderly person with this disease is identified and prevent the spread of this virus to other elderly people. Necessary instructions for managing these conditions should be prepared in advance and provided to caregivers. All people who are in contact with suspected elderly people must use personal protective equipment and if the elderly person tests positive, the people who have been in contact with him must be checked for infection and quarantined for at least fourteen days. In these centers, there

should be enough personal protective equipment for caregivers and the elderly to prevent the spread of the disease to others if one of the elderly is infected. The elderly should be taught to regularly disinfect their hands with soap and water or solutions containing alcohol and to avoid contact with the mouth, nose and eyes. Bathrooms, toilets, beds, wheelchairs, railings by the stairs, doors, and all items that are touched by the elderly and staff should be regularly disinfected. The new elderly must be screened for this disease before admission, and if their test is negative, they will be admitted.

## Conclusion

The spread of the Covid-19 virus has faced serious challenges in human life. Many businesses were closed, schools were closed, travel restrictions were in place, many people were advised to stay at home, people were forced to use personal protective equipment, and many countries' economies stagnated. But we can safely say that one of the most important challenges is the consequences of this disease in the elderly. The highest rate of mortality, hospitalizations, hospitalizations in the intensive care unit and complications caused by this disease are seen in the elderly. Many elderly people have stayed at home for a long time, have difficulty accessing their daily needs, and are exposed to the risk of social isolation, abuse, and age discrimination were conducted. The results showed that healthcare workers are primarily at high risk. According to the results of this study, 7.31% of health care workers had contact with the cases of Covid-19. In this study, 3.27% of the participants were people who provided services to patients diagnosed with Covid-19. 3.30% of health service workers were doctors, 3.38% nurses, 9.25% other health services and 5.5% office workers. In another study in China on 1257 health care workers who treated patients with Covid-19, in total, 4.50%, 6.44%, 0.34% and 5.71% of the participants had symptoms of depression, anxiety, and insomnia, respectively and reported distress. In this study, nurses, women, people working in Wuhan, and frontline workers reported more severe symptoms in all measurements. Frontline work is an independent risk factor for worse mental health outcomes across all relevant dimensions. In another study in China during an acute SARS outbreak, 89% of health care workers in high-risk situations reported psychological symptoms. The psychological response of health care workers to infectious disease epidemics is complex. Distress factors may include feelings of vulnerability or loss of control and worry about one's health, the spread of the virus, the health of family and others, changes in work, and separation. Zhang et al published data from an online cross-sectional survey of medical health care workers working in this hazardous situation in China. These participants were compared with a sample of non-physician health care workers working in the same areas. In this study, the medical staff reported the highest level of anxiety, depression, insomnia and obsessive-compulsive symptoms.

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