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A Review of COVID-19: The Main Ways of Transmission and some Prevention Solutions, Clinical Symptoms, more Vulnerable Human Groups, Risk Factors, Diagnosis, and Treatment

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Abstract

COVID-19 is a virus that causes acute respiratory syndrome. Although it is less deadly than other members of its family, i.e. SARS and MERS, its extremely rapid transmission rate has become a widespread concern today. Airborne droplets, environmental surfaces, nasal mucosa, urine and fecal samples are among the routes for the transmission of this virus. Both temperature and humidity factors affect the viability of the virus and its mortality rate. Increasing the ambient temperature makes the virus unstable, while lowering the temperature contributes to its stability. Due to the fact that the main route for the transmission of this virus is the particles containing the virus, observing the social distance of at least one meter, using masks as well as air purification systems can reduce the risk of virus transmission to some extent. This contagious virus has made life difficult for everyone in the community, especially pregnant women, children and the elderly. This viral infection can be diagnosed in many ways, including laboratory tests, molecular tests, the chest X-ray and CT scan. It is worth noting that chest CT scan is more sensitive than other methods and is used as the first line of diagnosis. Despite numerous efforts, no definitive cure has yet been found and isolation of those involved is recognized as first-line treatment. The treatments so far can be divided into three categories: general treatments, pharmacological treatments, and diet. General treatments involve isolation, mask use, oxygen therapy, room ventilation and more. Because of the rapid spread and the many challenges that this viral infection has created, scientists have used many of the drugs that were previously used to treat the influenza, malaria, AIDS, etc., some of which have been used to treat the viral infection. It should be noted that some of these drugs were very effective on some people's bodies. Some of these drugs were even used for pregnant mothers. A proper diet and the use of certain vitamins such as iron, zinc, vitamins A, B, C, E can also be effective in preventing and treating this viral infection. Many efforts to develop a vaccine against this virus infection began about two weeks after the outbreak and the attempts to reach this goal continues.

Keywords: COVID-19, SARS, MERS, Diagnosis, Treatment

1 Introduction

The coronavirus belongs to the crown-like family of viruses, named after the appearance of the virus under an electron microscope as the viruses have crown-like spikes protruding from their surfaces. The main organs of the body targeted by the coronavirus are the lungs and the human respiratory system (Fig.1), followed by complications such as acute respiratory syndrome (SARS-CoV-2). In terms of genetic sequencing, it is shown that COVID-19 has an 80% similarity to SARS-COV and an 50% similarity to MERS-COV, from

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which both are generated as they have (SARS-COV and MERS-COV) emanated from bats. However, the COVID-19 mortality rate is much lower than those of SARS-COV (9.14%) and MERS-COV (34.4%), respectively [1- 3].

COVID-19 is an enveloped and non-segmented virus with single-stranded RNA. Its beta-coronavirus genus includes SARS-COV belonging to the family of coronavirus with a subfamily of Orthocoronavirinae, and a subgenus of Sarbecovirus. The amino acid sequence of this virus is very similar to that of the SARS-COV [4, 5]. In vitro studies have shown that SAR-CoV-2 can be transmitted from animal to human as well as from human to human because this virus, like SARS-CoV, uses ACE2 (angiotensin-converting enzyme 2) as a cellular receptor for cell entry and since this receptor is expressed in a wide range of animals (except mice and rats) as well as humans [6, 7].

Nonstructural protein 2 (NSP2) and nonstructural protein 3 (NSP3) are two SARS-CoV-2 structural proteins, both of which play an infectious role in this virus and are involved in its differentiation. There are also two strains of SARS-CoV-2, i.e. type L (70%) and type S (30%). When compared, type L is shown to be more aggressive and more contagious than type S [8, 9]. According to a number of studies, the COVID-19 virus first attacks the respiratory mucosa cell and then the other cells. When these cells are invaded, a set of intracellular interactions eventually leads to the activation of a large number of immune mediators, including inflammatory cytokines, adapter protein (MyD88), interferon I (IFN-α / β) in the lower airways, as a result of which the lungs of the infected person can be damaged, thus the critical condition for the person. That is the reason why the blood plasma of people infected with COVID-19 experience increased levels of cytokines and chemokines including IL-1, IL-2, IL-4, IL-7, IL-10, IL-12, IL-13, IL-17, GCSF, macrophage, colony-stimulating factor MCSF, IP-10, MCP-1, MIP-1α, liver growth factor (HGF), IFN-γ and TNF-α [10-20]. The most common ways, through which COVID-19 is transmitted from one human to another include droplets and respiratory fluid, as well as person-to-person contact or feces [21-23]. Given the well-known responsibility of the virus in causing respiratory diseases, it only affects some of its hosts' lungs and causes mild, severe or critical symptoms, depending on the host body. The incubation period of the virus is reported to range from 2 and 14 days; a period when, on average, every person has the potential to spread the infection to 2.2 individuals, explaining the virus's widespread dissemination [24-26]. However, the mortality rate of COVID-19 is less than that of SARS and MERS [24, 26]. The resistance of this virus, moreover, will decrease at 56 ° C for 30 minutes, as well as at the presence of 75% ethanol, peracetic acid and chlorine-containing solutions [27].

2 The Main Transmission Ways and Some Prevention Solutions

1.2 Airborne Droplets

One of the main ways, through which this virus is transmitted is viral droplets caused by coughing and sneezing. These droplets are often heavy and can be scattered over a maximum radius of 2 meters [28]. Small virus droplets can travel up to ten meters and thus transmit the virus from an infected person to a healthy person. This is considered as one of the main routes of virus transmission in indoor environments [29]. Airborne droplets are the first route of human-to-human transmission of the virus. Transmission of the virus at a distance of one meter (about 3 feet) has a higher risk of transmission. However, the maximum distance required to transmit the virus is still unknown [30-33].

Airborne particles can be detected up to three hours after aerosolization [34]. Respiratory particles move under the influence of gravitational force, however, their infectious and pathogenic potential is unknown. 17 aerosol is less than 10 μm in diameter, which is transmitted from the body of an infected person to the outside environment during coughing or sneezing, even when the infected person has no clinical symptoms or mild symptoms, thus enabling environmental transfer [35, 36]. Additionally, the exhaled air through people infected with the virus is another main source of virus transmission. Nonetheless, using masks, observing a distance of at least one meter and allocating a separate room with proper ventilation for people in home quarantine is a helpful way of preventing the spread of the virus to others [22, 37-41].

2.2 Environmental Surfaces

Numerous studies have revealed that in addition to direct transmission through viral droplets, indirect transmission through infected surfaces to the virus is also possible. Viral particles may survive on surfaces for two or three days [34, 42]. Virus droplets on the surface are a potential source of virus transmission since they can live on the surface for a long time [43].

3.2 Nasal Mucosa, Urine and Fecal Samples

These cases can be also other sources of virus transmission [44]. Possibility of nucleic viral diagnosis viral acids are found in urine, feces, and gastrointestinal mucosa. There is some evidence that the virus can be detected in stool samples, even in cases where the throat swabs were negative. Detection of the virus in fecal samples indicates the possibility of transmission through the digestive tract or is re-exposed through aerosols that may contain viruses. Therefore, the necessary standards should be observed to prevent the transmission of the virus during fecal transport in patients with COVID-19 [45-47].

4.2 Influence of Temperature and Humidity

Some studies have shown that there is a negative relationship between ambient temperature and absolute humidity and mortality from COVID-19. Evidence has shown that environmental cold can reduce immune system function and make conditions worse for people suffering from COPD. Some laboratory findings have shown that phagocytic function of pulmonary alveolar macrophages decreases under the influence of cold stress. Breathing cold air can lead to bronchial contraction, which can increase the susceptibility of the lungs to infection caused by the COVID-19 virus. Humidity is also another factor as evidence has shown that reducing ambient humidity can be dangerous. Dry air respiration can also lead to respiratory epithelial damage and lead to COVID-19 virus infection [42, 48-52].

5.2 Some Solutions to Reduce Virus Transmission

Given that early detection of infection can prevent further transmission of the disease, effective strategies in areas are as follows: specimen collection environment, collectors, sampling methods and specimen management. Such strategies can reduce the risk of infection with this virus. Designing special rooms for nasopharyngeal swab sampling, installation of air conditioning systems, use of ultraviolet air purifiers, disinfection of medical devices, desired surfaces, floor, walls with 1000 mg solution / L chlorine-based and places that come in contact with the discharge from the body of infected people such as saliva, vomiting should be dried first with a clean cloth and then with a clean cloth soaked in 2000 mg / L chlorine-based solution covered for 30 minutes [53, 54].

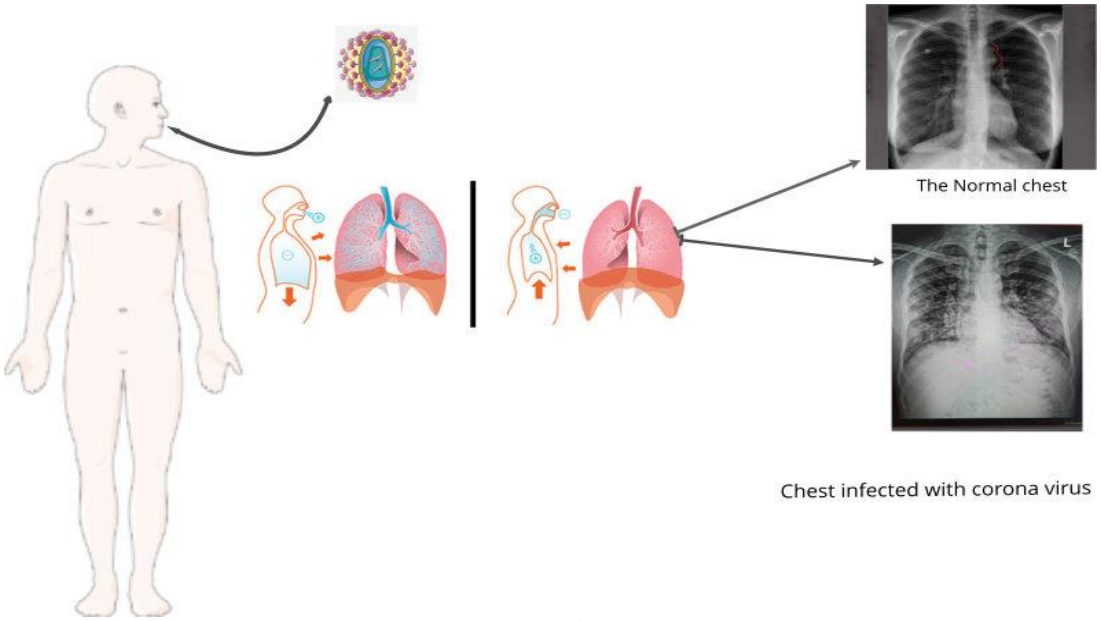

Figure 1: The Major Organ Infected with Coronavirus

Due to the persistence of SARS-CoV-2 aerosols in the air for several hours, the use of air purifiers can be considered as a complementary measure to prevent the transmission of this virus. Using HEPA filters can effectively eliminate virus-laden aerosols. But one problem that has yet to be solved is that the filters used must be completely disposed of as medical waste or disinfectant to prevent secondary contamination and re-transmission of the infection, and the instructions are still there. Moreover, there are no proper guidelines for addressing this issue [55-60]. The use of electrostatic air filtration and purification systems with different technologies including Kronos Air Technologies can be used to disinfect air. The use of these systems can be effective in places such as hospitals and other public facilities [59].

3 Clinical Symptoms

The clinical symptoms of the virus are similar to those of SARS and MERS. Also, depending on their host body, the symptoms range from mild to severe which include fever, cough, shortness of breath, myalgia or fatigue, sputum production, headache, hemorrhage, diarrhea, respiratory distress syndrome (ARDS), heart damage, acute kidney injury (AKI), septic shock, and increased inflammatory cytokines, namely, IL2, IL7, IL10, GCSF, IP10, MCP1, MIP1A and TNFα [28, 29].

4 The Influence of Race, Age, and Gender on the COVID-19 Outbreak and Spread

As mentioned above, the coronavirus uses ACE-2 receptors to enter its host's cells. It is a molecular surface highly expressed in lung AT2 cells, upper esophageal epithelial cells, and ilium absorptive enterocytes cells. In addition, the expression level of ACE-2 is much higher in Asian populations than in those of the European and American ones. Gender also affects the expression level of this receptor in such a way that it has a higher expression level in males than in females [30, 31]. In terms of the age group, patients aged 30 to 79 years, with a mean age of 47, are also more susceptible [32, 33].

5 Corona Virus in Pregnancy

The weaker immune system during pregnancy makes pregnant women susceptible to many diseases. The COVID-19 spread, as well as its resultant stress, bring about mental and spiritual health problems for pregnant mothers. Stress is known to be a causative agent for preeclampsia, depression, increased nausea, vomiting, low APGAR score, and preterm labor during pregnancy. Therefore, the rising prevalence of the virus is likely to pose many risks to pregnant women in different countries. Meanwhile, no information is available on the effect of the virus on pregnancy outcome in the first and second trimesters of pregnancy, but infection with the virus in the third trimester of pregnancy appears to increase the risk of premature rupture of fetal membranes, preterm delivery, and fetal tachycardia. It has been also reported that the vertical transmission risk through amniotic fluid, cord blood, and milk samples are negative. Whether or not the virus can be transmitted vaginally from mother to fetus has not yet been confirmed. Moreover, it has not yet been confirmed if the virus increases the risk of miscarriage and stillbirth. Such uncertainties and concerns have caused pregnant mothers to terminate early and elective cesarean delivery. Furthermore, it should also be noted that, in addition to the above-mentioned problems, pregnant mothers' continued use of detergents containing sodium calcium and alcohol detergents can also lead to poisoning [34-46].

It is noteworthy that the COVID-19 mortality rate among pregnant mothers has been lower than that of SARS and MERS. However, no information has yet been confirmed as to the effect of COVID-19 on the placenta and embryo development, while SARS has been shown to affect the placenta and to impose possible limitations on fetal growth (fibrin deposition) [37, 47-54]. In general, the data on the impact of COVID-19 on pregnant mothers and their infants are insufficient and the reported evidence and results are inconsistent [55]. Meanwhile, measures which pregnant women are advised to take are as follows: they should avoid public places as much as possible, unnecessary travel, and contact with sick people. They should also observe personal hygiene, use counseling services to maintain their psychological well-being and prevent stressful situations. Finally, COVID-19-suspected pregnant mothers should be isolated. The urgent measures to be taken include oxygen therapy if needed, monitoring of contraction, as well as the connection of the fetus and the uterus to them [56, 57].

Additionally, the measures to be taken in order to prevent the transmission of the virus from the mother to the neonates

are to temporarily separate the fetus from the mother for at least two weeks with no breastfeeding [58]. Also, the factors that can have an impact on the mother and fetus's rate of infection and severity are the stage of pregnancy when the mother is infected, the mother's age, the pregnant mother's diet, differences in immune response, environment and delivery conditions, and the effects of the drugs [51].

6 Corona Virus in Children

Considering the COVID-19 high contagion level, the increase in the number of infected adults has increased the number of children infected with this virus at the same time [29]. Likewise, since the virus can be easily transmitted through individual contact or through contaminated surfaces, children can become infected through their parents, and or, with the entrance of a contaminated child into the school and further expansion of the community; a stage that could become the main distributor of COVID-19. Many studies have revealed that the COVID-19 transmission in children can have a rapid prevalence and occurrence, but children appear to develop a milder form of the infection, the so-called "second-generation" of COVID-19, which is very contagious. [59, 60].

One possible explanation for this mild infection in children could be that pneumonia occurs when lung tissue is destroyed and this mechanism can be less effective in children. As a result, the disease is milder and less fatal in children [61]. Nonetheless, the psychological impact of the virus and its consequences on children should not be overlooked. The prolonged confinement at home, fear of infection, hopelessness and boredom, lack of contact with classmates, friends, and teachers can be even more problematic and can leave lasting effects on children and adolescents as many of the issues and problems an adult faces are deeply rooted in their childhood [62, 63].

7 Corona in the Elderly

The COVID-19 risk of affliction and mortality increases in the elderly compared to the other groups. As age rises, the immune system also becomes weaker and more susceptible to a variety of diseases and infections, accounting for the greater susceptibility and mortality levels observed in people over 60 years old, especially those with chronic diseases such as cardiovascular one [64].

8 Risk Factors

The COVID-19 risk factors include: allergic diseases such as asthma, higher SOFA score, older age, cytokines, and chemokine response, damage to the epithelium, immune cell dysfunction, genetic predisposition, higher d-dimer, COPD, smoking behavior, kidney disease, hypertension, diabetes, gender, heart disease, coronary and lung disease, exposures [65-74], recent surgery or chemotherapy, cancer. especially lung cancer [75], the interval between the onset and exacerbation of symptoms until hospital admission, populated communities, and crowded places [25] .

9 Diagnosis

1.9 Laboratory tests

Advantages: Lymphocytopenia, CRP, LDH, leukocytopenia, all of which are manifestations of pulmonary virus infection, were increased in patients undergoing laboratory tests. Lymphocytopenia can be used as an indicator of infection with COVID-19 in the clinic. C-reactive protein, erythrocyte sedimentation rate, lactate dehydrogenase, and a prolonged prothrombin time can also be measured.

Disadvantages: Due to insufficient studies and experimental data, further studies are required to confirm the disadvantages of laboratory tests [27, 76, 77].

2.9 Molecular Tests (Genomic methods)

Advantages: Nasopharyngeal swab, sputum, secretion of the lower respiratory tract, blood and feces, out of which the most common is the nasopharyngeal swab.

Disadvantages: Due to a detection rate of less than 50%, repeated testing is required. The most common disadvantage is nasopharyngeal, but in bronchoalveolar lavage fluid, the higher is the detection rate, the greater will be the risk of infection transmission sampling [78, 79]. Although genomic methods of infection diagnosis can be effective and useful, they are expensive, especially when used on a large scale. Real-time reverse transcription-polymerase chain reaction (RT-PCR) conducted on respiratory tract specimens [39, 80, 81] can be widely used as the gold standard genomic method, although its limitations should be taken into account, including a limited detection window of specimens taken from nasopharyngeal swabs, false sampling, and sample contamination, which results in false-positive or false-negative results, difficulty obtaining samples, sample preparation, time-consuming procedure, and the lack of diagnostic kits [82-84]. Other disadvantages of this method in some cases are the need for long-term transportation, and the use of cold chains or inappropriate additives that may affect the sample and subsequently the result [85-87]. If the sample cannot be collected from the lower respiratory tract or this part of the respiratory tract does not show symptoms, the upper respiratory tract may be used to collect the sample. To this purpose, the sample must be a combination of nasopharyngeal and oropharyngeal swabs [88].

3.9 The Chest X-ray (CXR)

Advantages: It can show bilateral infiltrates as well as increased and thickened right lower lung markings, diffuse, bilateral, reticular, or airspace infiltrates, which, depending on the patient's history, may be related to bronchitis or pneumonia [89, 90].

Disadvantages: Since it is not very sensitive, it is not a good diagnostic tool in the early stages of the disease as it may show a normal outcome despite infection and illness in the body[91].

4.9 CT Scan of Chest

Advantages: CT scan imaging is a non-invasive, first-line imaging technique in screening, detection, monitoring and supervising during treatment. Additionally, compared to other methods, it also has fewer limitations [92]. Analysis of some observations from the chest CT scan has shown that, because of its high sensitivity, this imaging technique can be useful in early detection of disease. Furthermore, some even believe that CT scans are more sensitive than PCR [93]. CT images taken from patients show ground-glass opacity, bilateral patchy shadows and bilateral pleural effusions [25]. As mentioned above, the symptoms of the virus in children are milder than in adults, which is shown by the CT scans as the CT findings are the modest [94, 95]. The results of the observations from CT images also indicate the severity of the disease [96-98]. Computed tomography (CT) can be used as the first and fastest reference for diagnosis, especially in cases where the person under examination is suspected to be clinically symptomatic, thus leading to the initiation of the measures and treatments needed to treat the individual in the shortest possible time [99].

Disadvantages: Even though a computed tomography (CT) scan of the chest is definitely the most useful method of pneumonia diagnosis, it is risky for pregnant women as the fetus is exposed to X-rays. If CT scan is performed, it should be done in a way that minimizes radiation and therefore reduces damage to the fetus [100]. Fig.2 shows these diagnostic pathways. Is there any association between results obtained from RT-PCR and CT scans? And is the sole using one of these two tests alone sufficient to fully diagnose the disease? According to the observations made so far computed tomography imaging can be performed as the first line of diagnosis and monitoring. In some cases, despite the negative results of RT-PCR, CT scan of chest imaging shows evidence of virus infection, especially in patients with early-stage disease [101]. If the RT-PCR test results are negative, it is best to use a set of factors including exposure history, symptoms, typical CT imaging features, and clinical diagnosis [99].

One possible reason for the fact that RT-PCR results are shown to be negative at an early stage may be the probable kinetics of SARS-CoV-2 since the incubation period of the virus is approximately six days (from 2 to 11 days) and the average time for the onset of symptoms and hospitalization is about seven days (4-8 days) and the average duration of symptoms is about 13 days (24-5) [102-104]. What has recently been approved by the Food and Drug Administration (FDA) is that a negative result of RT-PCR testing as a single element cannot completely rule out SARSCoV-2 infection and that repeated testing is required, especially with samples derived from nasopharyngeal and oropharyngeal swabs. Finally, it can be said that the best way to diagnose this viral infection is incorporating all of the listed cases: RT-PCR (repeat if negative in suspected patients) + clinical evidence (probability of exposure, signs, symptoms (+ CT scan of the chest [105, 106].

10 Treatment

In this field, isolation is the first step to prevent the transmission of the disease to other people. Other preventive measures are the use of masks, adequate rest, ventilation of rooms, the use of oxygen when needed, controlling fever and cough, no use of antibiotics and routine antivirals such as oseltamivir in cases where SARS-CoV-2 infection is diagnosed by diagnostic methods. Although using corticosteroids has not yet been confirmed to cure the infection, low to moderate doses of these drugs for a short period are recommended by Chinese doctors. To date, there is generally no approved treatment, however, antiviral drugs such as ribavirin, lopinavir-ritonavir, administered to treat SARS and MERS, have also been used [24, 107-109]. Remdesivir has also been used to treat this viral infection with good results [110]. Researchers believe that, in addition to antiviral and antibiotic interventions, neuraminidase inhibitors, RNA synthesis inhibitors can also be effective in the treatment of this viral infection. Nucleoside analogues and HIV-protease inhibitors can also be used to reduce viral infection [111]. Moreover, 75mg oseltamivir, 500mg lopinavir, 500mg ritonavir orally and twice daily as well as 0.25g ganciclovir were used intravenously for 3 to 14 days [112]. Also, the EIDD-2801 compound with the potential to counteract seasonal and pandemic influenza virus infections can also be taken to fight SARS-CoV-2 viral infection [113].

Chloroquine, a drug widely used in the treatment of malaria, is reported to have a wide application in the treatment of patients with SARS-CoV-2 viral infections with good results. Chloroquine and hydroxychloroquine have very mild side effects such as cardiovascular disorders due to its narrow window of treatment, accordingly the use of this drug should be strictly regulated and not recommended for self-treatment [114-116]. Nelfinavir, pitavastatin, perampanel, and praziquantel may also be effective against this virus [117]. Kaletra is also an effective anti-HIV drug recently recommended for the treatment of this virus. The use of interferon in viral infection can also be effective, though it has a controversial result. Penciclovir, nitrazine, nalfamusta, redexivir (GS-5734) and favivir (T-705) can also be effective in the treatment of this viral infection [118-123]. Arbidol, darunavir, cobicistat, polyclonal IgG immunoglobulin (SAB-301) are also recommended [81, 124]. Niclosamide reduces virus function in infected cells and is dose-dependent [125] and glycyrrhizin also prevents virus uptake and infiltration at the early stages of virus replication [126] as well as shown in vitro to inhibit the reproduction of SARS-CoV2, whereas IFN-α is an antiviral used to treat hepatitis [127]. Similarly, imatinib is shown to be effective in the treatment of SARS-CoV-2 viral infections by preventing endosomal membrane virions [128]. Other sets of drugs including saquinavir, carfilzomib, atazanavir, tipranavir, fosamprenavir, enzaplatovir, presatovir, abacavir, bortezomib, elvitegravir, maribavir, raltegravir, montelukast, deoxyrhapontin, polydatin, chalcone, disulfiram, carmofur, shikonin, ebselen, tideglusib, PX-12, TDZD-8, cyclosporin A, cinanserin , as well as some Chinese herbal remedies such as Rhizoma Polygoni Cuspidati and Radix Sophorae Tonkinensis may have effective compounds against SARS-CoV-2 [129]. Shufeng Jiedu Capsule (SFJDC) and Lianhuaqingwen capsules are also two Chinese medicines shown to play a significant role in both prevention and treatment of this viral infection, although further studies and tests are required to prove their functioning. [130, 131].

As mentioned above, SFJDC, a traditional Chinese medicine for the treatment of influenza, is also recommended to be used for SARS-CoV-2 viral infection [132]. Nitazoxanide is an antiprotozoal agent that potentially inhibits certain viruses, including 2019-nCoV [123]. Losartan, Telmisartan, Olmesartan are drugs used to control high blood pressure and kidney disorders, which can be used to control blood pressure in patients hospitalized with SARS-CoV-2 infection [133, 134]. Some drugs are also used to treat SARS-CoV-2 virus infections during pregnancy including Kaletra (lopinavir and ritonavir), remdesivir and chloroquine. Given the current situation and the very sensitive status of pregnant mothers, it seems reasonable to use these drugs. Although there is no definitive cure for this viral infection and more evidence is needed to confirm it, the current sensitive conditions partially justify their use for pregnant women [55]. In addition to the above-mentioned drugs that are against viral infection caused by COVID-19, proper nutrition and strengthening the immune system can also play a major role in preventing and combating the virus and the resultant infection. Use of vitamins, namely, A, B, C, D, E, omega-3, polyunsaturated fatty acids (PUFA), selenium, zinc, and iron, all help strengthen the immune system and can play a major role in preventing and also helping to cure this viral infection [135, 136]. There have been several attempts to develop a vaccine against the COVID-19 virus, however, an estimated 18 months are required for the vaccines to be accessible as put by the WHO [137].

Several research groups have been working to develop the vaccine in the very weeks following the outbreak of COVID-19 viral infection. To achieve this objective, the selection of the target antigen and vaccine substrate is likely based on studies conducted on the vaccines developed for SARS-CoV and MERS. The factors to be taken into account in the development of the COVID-19 vaccine are target antigen(s), immunization route, correlated-immune protection, animal models, scalability, production facility, target product profile (TPP), outbreak forecasting and target population [2, 138].

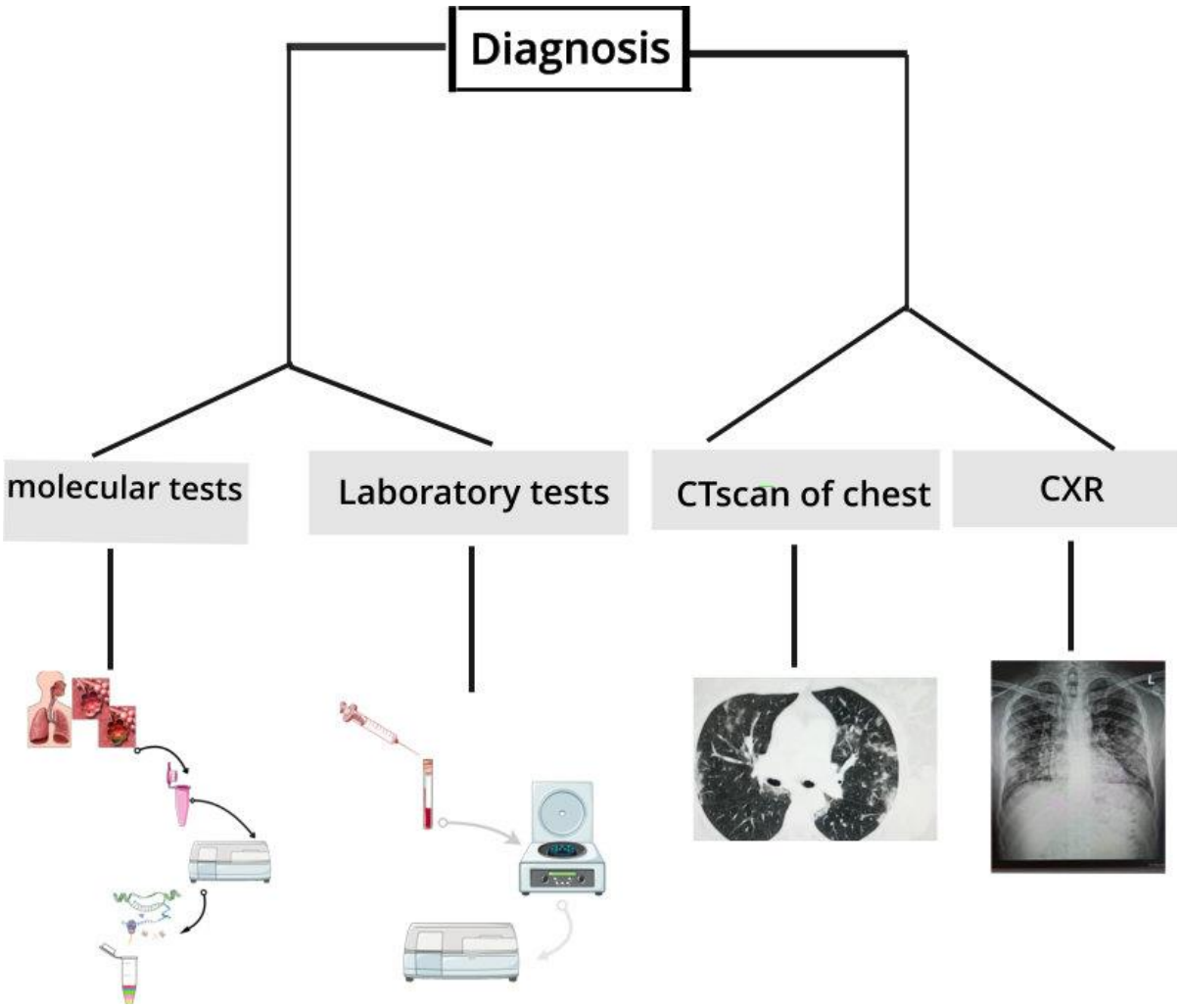

Figure 2: Illustrates Ways to Detect Coronavirus

11 Conclusion

Depending on its host body immune system, its rate of infection and its severity, the 2019-nCoV virus is divided into three mild, acute, and critical categories. According to the observations, this virus is relatively moderate in children and is critical and acute in the elderly. Some risk factors including age, gender, race, exposure, etc., can also impact its prevalence and severity. CT scans are believed to be among the best diagnostic tools in the early stages of the disease. To date, the best treatments used include general treatments, nutritional treatments, and medications. It should be noted that a definitive cure for the virus and its resultant infection has not yet been identified.

Ethical issue

Authors are aware of, and comply with, best practice in publication ethics specifically with regard to authorship (avoidance of guest authorship), dual submission, manipulation of figures, competing interests and compliance with policies on research ethics. Authors adhere to publication requirements that submitted work is original and has not been published elsewhere in any language.

Competing interests

The authors declare that there is no conflict of interest that would prejudice the impartiality of this scientific work.

Authors' contribution

All authors of this study have a complete contribution for data collection, data analyses and manuscript writing.

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