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## Health Measures Incorporated by Kerala Government Against Covid-19 Outbreak

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**Abstract:** Coronavirus disease COVID-19 is an infectious disease, first discovered in China. This outbreak of 2019 novel virus disease in China spread quickly worldwide. In 2002 the humankind first witnessed SARS-COV, and COV was believed to be zoonotic. The source of origination and transmission are important to determine and understand the virus and to discover new preventive strategies. Coronavirus being a highly mutable virus made it difficult for the discovery of the vaccine. Most of the people infected experience mild to moderate respiratory illness. Other common symptoms include fever, cough, and myalgia or fatigue. Some patients may have a headache or hemoptysis and can be relatively asymptomatic. The best way to prevent and slow down transmission is to be aware of the COVID-19 virus, the disease it causes, and how it transmits. The government has taken various health measures against the COVID19 outbreak like practising respiratory etiquette, quarantining and social distancing, practising 1m apart, use of personal protective equipment, hand hygiene, water sanitation, and hygiene, waste management, surface infection, hospital and home isolation, mental health management, immunization and ban on smoking and travel restrictions. The government thus implemented these measures and it is the role of every citizen to follow these measures and pave the way for a better living.

**Keywords:** COVID-19; Prevention and control; Health measure; Transmission rate

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### INTRODUCTION

COVID19, an infectious disease caused by a newly discovered coronavirus is a life-threatening disease of 2020. In December 2019 there was a cluster of pneumonia cases in Wuhan City in Hubei Province caused by an unknown virus now named COVID19. This outbreak of 2019 novel coronavirus diseases (COVID-19) in China has spread quickly worldwide (Brüssow, 2020). Coronaviruses were first believed to only infect the animals until the world witnessed a severe acute respiratory syndrome (SARS) outbreak caused by SARS-CoV, 2002 in Guangdong, China (Zhong *et al.*, 2003). Later another pathogenic coronavirus, known as Middle East respiratory syndrome coronavirus (MERS-CoV) caused an endemic in Middle Eastern countries was identified (Wang *et al.*, 2013). The Chinese public health, clinical, and scientific communities took prompt response for rapid recognition of the disease. They shared the viral gene recognised to the world. It was observed that there are four major structural proteins encoded by the corona viral genome on the envelope, one of which is the spike (S) protein that binds to angiotensin-converting enzyme 2 (ACE2) receptor and mediates subsequent fusion between the envelope and host cell membranes to aid viral entry into the host cell (Lai *et al.*, 2020). Genomic analysis revealed that the virus was phylogenetically related to severe acute respiratory syndrome-like (SARS-like) bat viruses (Wu *et al.*, 2020). Thus the bat could be the primary reservoir. Based on the current data, it might have been transmitted to humans via pangolin or other wild animals sold in the Huanan seafood market (Wang *et al.*, 2020) (Guan *et al.*, no date). The intermediate source of origin and transfer to humans is still not known and is under research. It has higher levels of transmission rate than SARS-COV which may be due to the genetic recombination event at S protein in the RBD region of SARS-CoV-2 having enhanced transmission ability (Basu and Chakraborty, 2020). It was estimated that coronavirus has a median incubation period of 3 days (range 0 to 24 days). Researchers found SARS-COV-2 virus in the urine of the patients (Kumar, Ashok Kumar and Brundha, 2016). Most of the people infected experience mild to moderate respiratory illness. Other common symptoms include fever, cough, and myalgia or fatigue. Some patients may have a headache or hemoptysis and

can be relatively asymptomatic(Chan *et al.*, 2020)(Shreya and Brundha, 2017). Research showed that COVID-19 attacks the 1-Beta Chain of the haemoglobin and captures the porphyrin thus inhibiting the human heme metabolism and decreasing the haemoglobin levels in the blood(Brundha, Pathmashri and Sundari, 2019). Older individuals and those with severe chronic problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are prone to develop respiratory failure due to severe alveolar damage(Chen *et al.*, 2020). Mesenchymal stem cells show a promising approach in combating COVID-19 induced pneumonia(Timothy, Samyuktha and Brundha, 2019). Kidney biopsy showed acute liver damage due to SARS-COV-2 Nephropathy(Brundha, 2015). People with weakened immune systems due to various conditions like cancer, AIDS can easily be affected by COVID-19(Balaji, Brundha and Path, 2016). The best way to prevent and slow down transmission is to be aware of the COVID-19 virus, the disease it causes, and how it transmits. This current review summarises the health measures incorporated against COVID19 Outbreak. Previous research about other viral diseases and clinical conditions can help in studying the disease in detail(Prashaanthi and Brundha, 2018)(Hannah *et al.*, 2019). The source of origination and transmission are important to determine and understand the virus and discover new preventive strategies. Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Deogade, Gupta and Ariga, 2018; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; J *et al.*, 2018; Menon *et al.*, 2018; Prabakar *et al.*, 2018; Rajeshkumar *et al.*, 2018, 2019; Vishnu Prasad *et al.*, 2018; Wahab *et al.*, 2018; Dua *et al.*, 2019; Duraisamy *et al.*, 2019; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Gheena and Ezhilarasan, 2019; Malli Sureshbabu *et al.*, 2019; Mehta *et al.*, 2019; Panchal, Jeevanandan and Subramanian, 2019; Rajendran *et al.*, 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma *et al.*, 2019; Varghese, Ramesh and Veeraiyan, 2019; Gomathi *et al.*, 2020; Samuel, Acharya and Rao, 2020)

### **Genomic variations and transmission patterns of human coronavirus**

SARS-CoV-2 has been reported over 80% identical to the previous human coronavirus (SARS-like bat CoV). The Structural proteins are encoded by the four structural genes, including spike (S), envelope (E), membrane (M), and nucleocapsid (N) genes(Morawska and Cao, 2020). It was reported that the spike glycoprotein of the Wuhan coronavirus is modified SARS-COV and a not known Beta-COV. Thus the DNA recombination was found to be involved in the spike glycoprotein which assorted SARS-COV (CoVZXC21 or CoVZC45) with the RBD of another Beta CoV. This could be the reason for cross-species transmission and rapid infection(Wan *et al.*, 2020). According to a current study, the COVID-19 virus is primarily transmitted between one person to another through respiratory droplets and via direct contact routes. It spreads through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. When the droplet particles are >5-10 µm in diameter they are termed as respiratory droplets, and when then are <5µm in diameter, they are called as droplet nuclei. Mouth, nose, and conjunctiva are at potential risk. Transmission may also occur through fomites in the immediate environment around the infected person. Therefore, the transmission of the COVID-19 virus can occur by direct contact with infected people and indirect contact with surfaces in the immediate environment or with objects used on the infected person(Cascella *et al.*, 2020). This is observed most commonly among Healthcare workers. It is important to understand the pathogenesis of the virus to solve the mysteries about the disease(Mp, Brundha and Nallaswamy, 2019).

### **Health measures incorporated by the Kerala Government**

Until now, no promising clinical treatments or prevention strategies have been developed against human coronaviruses. However, the researchers are working to develop efficient therapeutic strategies to cope with the novel coronaviruses(Singhal, 2020). Therefore it is essential to prevent the transmission by following the health measures incorporated by the government. WHO has given a set of guidelines for infection. Prevention and control again COVID-19. Kerala was the first state in India to reduce the number of cases during the initial stage of the outbreak(Kundu and Bhowmik, no date). The state government of Kerala has been trying to check the spread of disease by tracking, locating, and treating the infected persons, though there has been a gradual rise of the pandemic in India. Kerala government initiated the distribution of free food kits for ration cardholders. The first case of the COVID-19 pandemic in Kerala (which was also first in all of India was confirmed in Thrissur on 30 January 2020). This article briefly discusses the health measures incorporated by the Kerala government against the COVID-19 outbreak. It is important to create awareness among the people about the spread of the virus and its prevalence in aged individuals(Preethikaa and Brundha, 2018)(Shenoy and Brundha, 2016).

### **Practising respiratory etiquette**

Since the spread of Coronavirus is mainly due to the spread of the droplets, it is important to practise etiquette. Covering your cough is one of the basic etiquettes to be followed. Using a tissue to cover your mouth and nose while sneezing or coughing and disposing of the tissues used in the nearest waste receptacle is important (Arwady *et al.*, 2016). Which will alerts can be placed at the entrance to outpatient facilities instructing them to

follow hygiene and inform the physician or the healthcare professional if they have any symptoms of respiratory infections(Alvarez, Argente and Lippi, 2020).

### **Quarantine**

Kerala government strictly observed the people who migrated from countries by the healthcare authorities if they showed any symptoms of the disease. Kerala Being the first state in India which mandated 28 days of home quarantine for those returning from countries affected by coronaviruses or red/high-risk zones. Quarantining has led to various effects like loss of jobs, obesity, stress symptoms, confusion and anger, and other negative psychological effects(Parmet and Sinha, 2020). But this is one of the potential methods to separate people and their exposure to the infectious agent. Financial loss due to inability to work creates a serious economic hardship, the Government thus implements other techniques like free food kits to people with ration cards to support the affected. Isolation and quarantine can be voluntary or imposed by Law(Nussbaumer-Streit *et al.*, 2020). Quarantine along with other public Health measures can control the transmission of the pandemic virus(Livingston, Desai and Berkwits, 2020).

### **Personal protective equipment**

Coronavirus can spread both by airborne or by direct contact. Healthcare Workers Involved in patient care activities are recommended to use personal protective equipment for the care of Contact and droplet precautions. In aerosol procedures, they require direct contact with the patient. Hence a respirator mask such as N95, FFP2, FFP3 is used. This is one of the important prevention and control strategies among the bundle of measures implemented by the government. The current stocks of personal protective equipment are insufficient particularly medical masks and respirators, the supply of gowns and Goggles are soon expected to be insufficient. The surging global demand. One can optimize personal protective equipment availability by using it appropriately, minimizing its need, and coordinating personal protective equipment supply chain (Adams and Walls, 2020). Personal protective equipment must be used by each and everyone including the hospital workers(Ravichandran and Brundha, 2016).

### **Hand hygiene, Water Sanitation, and Hygiene, Waste management**

Public health measures primarily involve hand washing using alcohol-based sanitizers. Some asymptomatic individuals transmit the disease to family members. Thus there is a need for prevention of cross infections(Corbet *et al.*, 2020). It is also necessary to maintain proper water sanitation and hygiene. The food intake must be washed properly and well cooked. Raw vegetables and fruits intake should be washed thoroughly before in eating. It is advised to soak the raw vegetables in saltwater for a few minutes before cooking to prevent microbial growth. Animal-based products like meat, chicken, and beef were prohibited in China and the markets were closed. Though there was no such ban in Kerala and other states of India, it was advised by the government to reduce the intake. Waste disposal management is another important strategy to be followed. The equipment used for treating the patient must be disinfected thoroughly(Emanuel *et al.*, 2020).

### **Home Isolation**

Those who are clinically assigned as pre-symptomatic patients can follow home isolation. The requisite facility at their residence for self-isolation and also for quarantining family contacts. They can have a caregiver 24X7, the caregiver, and all other close contacts with the patient are given with hydroquinone to prevent the infection spread. The discovery of the vaccine for this unstable virus is still under process. Thus the only way to prevent this disease and it spreads is by socially distancing ourselves from others. The government has implemented different stages of lockdowns and has played an important role in preventing the spread. This can have a psychological impact on people(Harsha and Brundha, 2017). People may experience post-trauma stress disorder, confusion and frustration(Mukhtar, 2020).

### **Surface Disinfection**

Studies have shown that SARS-COV-2 can persist on a variety of surfaces from hours to days. It was proved that they can resist for up to 9 days at room temperature(Warren-Gash, Fragaszy and Hayward, 2013). This indicates that a person may be infected even after touching the infected objects. Thus this can be reduced by using disinfectants on the surfaces. WHO recommends the protection and disinfection policies against COVID-19. Has to be done consistently(Foged *et al.*, 2014). It has been proved that 0.1 percentage of sodium hypochlorite is applied worldwide for disinfecting the virus. It can reduce contamination within one minute(Liu *et al.*, 2020).

### **Mental Health Management Committee**

Managing one's mental health is important as people may experience fear, worry and stress. Working from home, temporary or permanent unemployment, homeschooling may affect people's mental health as well as

your physical health (Chinazzi *et al.*, no date). The government has released a set of guidelines to be followed (Ebrahim *et al.*, 2020). There are many online training courses available to prepare our mind against COVID-19 and to deal with the mental stress related to it. The government has supplied the daily necessities of people. Financial loss due to inability to work creates a serious economic hardship, the government thus implements other techniques like free food kits to people with ration cards to support the affected.

### **Immunization and Ban on smoking**

The government advises people to intake food which would boost their immunity. It was studied that the BCG vaccine provided immunization against COVID-19. Smoking gradually reduces the immunity of the person and thus making him more prone to the infection. The government banned smoking and alcohol consumption. People were advised to take vitamin C rich food to boost their immunity (Kalaiselvi and Brundha, 2016). The food consumption must be healthy and should be free of the contaminants and properly cooked. Scientists around the world are working on potential treatments and vaccines for the new coronavirus disease. Even though technology has advanced to allow us to do certain things more quickly, the government has to rely on social distancing, contact tracing, self-isolation and other measures due to lack of ability to find the cure (Ferdioz J, 2016).

### **Travel Restrictions**

People were not allowed to travel from one country to another initially and later when the condition prolonged and got worse they were not allowed to travel interstate. Self-isolation is one of the important strategies for controlling the outbreak. The medical screening test was done for patients who travel from infected countries. Those who were tested positive were sent to hospitals and when treated. Even in flights, they were made to socially distance themselves from one another and to follow the precautions. The travelling restrictions were imposed strongly as this can easily transmit disease. PCR tests were done to diagnose COVID-19. Break the chain campaign was introduced to socially distance people from one another. They were provided bed or hand washes and sanitizers freely. Presently states allow restaurants and shops to reopen with full service. Some studies suggest that air conditioning may have been a mode of spread of COVID-19. The air conditioners were made to fit with HEPA filters to at least reduce its spread. Thus shops and restaurants were not allowed to use air conditioning. Our institution is passionate about high quality evidence based research and has excelled in various fields ( (Pc, Marimuthu and Devadoss, 2018; Ramesh *et al.*, 2018; Vijayashree Priyadharsini, Smiline Girija and Paramasivam, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai *et al.*, 2019; Sridharan *et al.*, 2019; Vijayashree Priyadharsini, 2019; Chandrasekar *et al.*, 2020; Mathew *et al.*, 2020; R *et al.*, 2020; Samuel, 2021)

### **CONCLUSION**

Preparation for an epidemic involves infection control and prevention strategies. We should understand the steps taken by the government against the outbreak and believe that these control measures are necessary to optimise the quality of care provided to COVID-19 patients and people surrounding them. The only way to prevent this disease is to reduce its transmission rate. The role of the government is to influence the people to follow the preventive measures. It is not only the duty of the sector but also the duty of every citizen of the country. The government should also take care of the health of the population which depends on the social determinants of health like living conditions, nutrition, safe drinking water, education, sanitation, early child development and social security measures during this epidemic. These health measures are to be properly followed by people, so our country can be in a better position. It is one's duty to follow and join hands with the government to fight against Corona.

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