

Asymptomatic carriers in COVID-19 pandemic outbreak: A potential risk

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Abstract

Virus has been a threat to the human society since ages. In the last 20 years, several viral epidemics has been reported by WHO such as the severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002 to 2003, H1N1 influenza in 2009 and Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012. In 2019 Corona virus came into play which has created a life threatening condition across all over the world. It is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). As approximately more than 8.03 M confirmed cases are reported worldwide and approx. 3, 32,424 confirmed cases are there in India, while 4,36,411 deaths has been reported worldwide. There is a marked correlation seen between the age group of the people, symptoms of the disease and prognosis of the disease. This article will provide a bird's eye view about the asymptomatic carriers as the knowledge is evolving day by day about this issue so people need to be updated. So, this article will highlight what are asymptomatic carriers, how they are detected and what is the need for detecting these asymptomatic carriers, how they have become a treat to the society.

Keywords: Coronavirus, SARS COVID -19, silent spreader, asymptomatic carriers, RT – PCR, viral load, outbreak, novel corona virus

Introduction

In 2019 an outbreak of a highly contagious disease of unknown cause that affected the respiratory system was spread in Wuhan, China which rapidly spread in across the globe within short span of time ^[1]. Later on, by using various molecular techniques the causative pathogen was found and known to be novel corona virus (2019-nCoV) or severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) ^[2]. SARS-CoV-2 is considered a novel human-infecting Beta-coronavirus. The whole genome level SARS-CoV-2 is closely related to bat-SL-CoVZC45 and bat-SL-CoVZXC21 ^[3].

On Feb 11th 2020, WHO named the pandemic disease as Corona virus disease? On Jan 30th 2020 WHO declared it as 6th public health emergency ^[4]. It eventually it became an international emergency ^[5].

There are various symptoms of corona virus disease such as fever, cough, headache, sore throat, diarrhea, dyspnea, gastrointestinal symptoms etc ^[6]. Many infected family members and healthcare workers have confirmed the person-to-person transmission of the virus ^[7]. There is a significant correlation seen between age and the virus, hence the most prone and affected age groups are the neonates and geriatric population ^[8]. In a study, published on January 29, of 425 COVID-19 patients in Wuhan there were no cases in children under 15 years of age ^[9, 10]. Moreover, the ones who are suffering from co-morbidities such as diabetes mellitus, hypertension, chronic liver disease etc. or any other immunocompromised disease are the most affected people ^[11]. Severe manifestations of the disease may be associated with coinfections of bacteria and fungi ^[12].

Even with strict lockdowns and social distancing measures, countries across the world are struggling to contain the spread of the novel coronavirus. This highly infectious disease has already resulted in 8.03 million positive cases

globally and continues to wreak havoc across the globe.

There are four types of COVID-19 cases –the verified positive patients or the symptomatic patients who are the primary sources of infection, pre- symptomatic, mildly symptomatic and the asymptomatic carriers ^[13].

Symptomatic patients are those who have developed signs and symptoms of COVID-19 virus infection. They are contagious in nature ^[14].

Pre-symptomatic patients are the ones that are being infected and incubating the virus. However, they still don't show any symptom. They are completely capable of spreading the infection and are more common than asymptomatic carriers.

Mildly symptomatic patients are those who display very mild symptoms (like mild cough or fever). There are some people that may develop unusual symptoms which are not typical to the COVID-19, such as loss of smell, taste and diarrhoea. This means some of the cases which appear to be asymptomatic may fall in the mildly symptomatic category ^[15].

Asymptomatic carriers refer to the people who are positive to COVID-19 test but develop no symptoms of the disease. However, they can propagate the infection during their incubation period, but are difficult to detect due to lack of symptoms. They can act as silent spreaders or invisible carriers of the disease.

But there is no appropriate data found yet which tells about these asymptomatic cases, that the patient is a carrier from the time they contacted the disease or they were asymptomatic throughout their journey ^[16].

Acc. to various researches, the lab findings that were common in every patient were lymphocytopenia ^[17, 18, 19], hypoxia, thrombocytopenia ^[20] and marked increase in C-reactive protein ^[21]. The most common chest x-ray finding in pneumonia patients is the significant ground glass

appearance^[22].

So, after detecting these patients by using RT-PCR and by the usage of personal hygiene measures and social distancing we can break the chain of transmission via asymptomatic carrier^[23, 24, 25].

Discussion

According to researchers the two biggest threat for the healthy population are the Nosocomial infections to the healthcare workers and hospitalized patients & the transmission of infection from asymptomatic carriers to the healthy population^[26]. Asymptomatic carriers are difficult to detect because they don't show any of the significant symptoms of corona virus disease.

The First, asymptomatic case was diagnosed by the positive viral nucleic acid test results, but it showed no COVID-19 symptoms or chest x ray abnormal findings.

But they can be detected by doing various lab tests such as Real-time reverse transcriptase polymerase chain reaction (RT-PCR) tests, as it detects the viral load found in these patients^[27], which is at a lower rate than the positives cases, basically viral load tells about how much infectious a person is^[28]. So by identifying asymptomatic cases and giving them antiviral drugs to decrease the viral load, will help in treating the patients, moreover lowering the risk of transmission of the disease. Therefore, it is very important to identify these asymptomatic patients as they are the potent carriers of the infection. A pre-symptomatic period is the incubation interval for Covid-19. It is the time between the exposure which turns into infection and results into onset of symptoms. This period is on an average of 5 to 6 days but can be up to 14 days. During this period, some infected people can be contagious. Therefore, transmission from a pre-symptomatic case can occur before symptom onset^[29]. As per World Health Organization India is at a crucial juncture in its fight against COVID-19, the country has responded with urgency and determination. It has aggressively stepped up the response measures - find, isolate, test, treat and trace. As per Indian Council of Medical Research (ICMR), out of 100 people with infection, 80 are asymptomatic. To find such patients door-to-door surveillance could be done with intensive testing in the hotspots and containment zones. But the idea of door to door surveillance and testing every other person of the country is neither feasible nor affordable for the population like India^[30].

According to the new set of guidelines, the patient should be clinically assigned as a very mild case or pre-symptomatic case by the medical officer. The patient should regularly inform his health status to the same. Also, the caregiver and all close contacts of such cases should take Hydroxychloroquine as a preventive medication prescribed by the treating medical officer. According to the health ministry of India, nearly 80 % of all Covid-19 patients exhibit very mild or no symptoms of the disease and they don't need constant medical attention. Only 15 % of them need oxygen and just 5% cases turned severe and required the ICU. If the majority of such patients can be sent home, then the load on the medical symptom will be reduced significantly.

As per Public Health Foundation of India- Asymptomatic persons who tested positive in the antigen test, if shown to be truly positive for viral exposure by other criteria, may be a source of infection to others as long as they harbor the

virus. Usually they are young, have a good immune response and may get rid of the virus quickly. But isolation is needed till they do so.

Scenario in some parts of India

New Delhi - There are 6,923 coronavirus cases so far in Delhi and 2,069 patients have recovered and 73 have died. Out of the 6,923 Covid-19 patients, only 1,476 were admitted to the hospitals, the rest or about 75% were getting treatment at their homes and Covid-19 centers^[31].

Karnataka - According to the data from Karnataka COVID-19 War Room over 76% of the total 753 positive patients (till May 8) were asymptomatic in the State, over 50% of those cases were discharged after recovery. Out of the 753 cases reported in the State (till May 8/5/2020) evening, 574 were asymptomatic. While Mandya has the highest number at 96.42% (of 28 cases, 27 are asymptomatic); North Karnataka districts of Vijayapura, Belagavi, Bagalkot, Bidar and Kalaburagi have asymptomatic cases above 79%.

Bangalore - Out of the 163 cases in Bengaluru, 105 are asymptomatic. In Mysuru, 68 of the 88 cases were asymptomatic^[32].

Scenario in different parts of the globe

China -has reported 16 new asymptomatic cases for May 7 it suggests that asymptomatic carriers are acting as a new challenge in this battle against the novel coronavirus.

Another study from China, however, showed the proportion of asymptomatic cases that emerged after the lockdown was lifted could be as high as 78 per cent.

Japan -The Japanese citizens evacuated from Wuhan, China and tested for COVID-19, 30% of those infected were asymptomatic cases.

Italy - The number of asymptomatic cases in the early days of the disease outbreak in Italy was found to be only 7 %^[33].

The number of asymptomatic cases on the Diamond Princess cruise ship increased as days progressed. Out of the 634 confirmed cases, a total of 306 and 328 were reported to be symptomatic and asymptomatic, respectively^[34].

United States of America - As per the director of the country's CDC, asymptomatic cases in the United States may be 25%.

South Korea - In South Korea it was found 3 out of 28 patients who contracted the disease were asymptomatic, when the disease was beginning to spread in the country.

Boston - When doctors tested 397 people staying at a homeless shelter in Boston, 36% came up positive for COVID-19 - and none of them had complained of any symptoms.

It is still a mystery why some people exhibit symptoms while others don't. May be it is being due to the difference in their innate immunity^[35]. But no as such proof has been justified till now.

Let's take an example of Typhoid Mary, who spread the typhoid fever to others without being symptomatic. Cryptosporidium, one of the major causes of diarrhea, almost 50% of the infected people didn't showed any symptoms^[36].

The virus can be spread not only by sneezing or coughing but also by exhaling as it also carries virus in the breath, the door handles or the surfaces touched by the infected person.

How contagious an asymptomatic person might be?

No matter what, if you've been exposed COVID-19 patient, you should self-quarantine for 14-days (incubation period). Even if you feel fine, you're still at risk of spreading the infection to others. Most recently it has been shown that high levels of the virus are present in respiratory secretions during the "pre-symptomatic" period that can last days to more than a week prior to the fever and cough characteristic of COVID-19. This ability of the virus to be transmitted by people without symptoms is a major reason for the pandemic [37].

How would you know if you come in contact with an infected person?

Well, the Indian Government has launched ArogyaSetu Application, which is designed to control the spread of coronavirus. It makes information available for the common people, thereby helping people to find out about COVID-19 positive cases present nearby their surroundings [38].

Treatment

There are various symptomatic treatment given to the patients for the cure of the disease such as antiviral therapy, oxygen therapy, plasma therapy, nucleoside analogs etc [39]. But there is no sure shot treatment available for the disease till date [40].

There are some measures that can be implemented till vaccination or any proper treatment is developed for prevention of the disease: -

- Social distancing should be strongly followed to prevent the transmission of infection from asymptomatic patients and maintain a distance of at least 6 feet from other people.
- Avoid stepping out of the house, except for absolutely essential chores.
- Quarantining of the asymptomatic carrier for 14 days should be done [41].
- Asymptomatic carriers should wear mask to minimize the transmission and should maintain proper personal hygiene measures.
- Eat healthy and immunity enhancing food items [42].
- Wear face mask while going out [43].

Conclusion

The review article provides latest information about the corona virus disease outbreak. It can affect all age groups. Symptoms show a close relationship with the age and comorbidities associated with the patient. There is no effective treatment found till date, while various researches and trials are still going on across the world. With a large number of asymptomatic cases found testing positive for COVID-19 and are recommended for home isolation. Global research on COVID-19 continues to be conducted, including how coronavirus 2 (SARS-CoV-2) is transmitted from asymptomatic people. Current evidence suggests that most through close contact with others. Available evidence from contact tracing reported by countries suggests that asymptotically infected individuals are much less likely to transmit the virus than those who develop symptoms. A subset of studies and data shared by some countries on detailed cluster investigations and contact tracing activities have reported that asymptotically-infected individuals are much less likely to transmit the virus than those who develop symptoms. Extensive studies on transmission from

asymptomatic patients are difficult to conduct, as they require testing of large population cohorts and more data are needed to better understand and quantified the transmissibility of SARS-CoV-2. WHO is working with countries around the world, and global researchers, to gain better evidence-based understanding of the disease as a whole, including the role of asymptomatic patients in the transmission of the virus. Therefore, controlling the asymptomatic cases will decrease the spread of the infection and in a way will control the pandemic, as they act as silent spreaders or invisible carriers of the disease.

Competing interests

The authors declare that they have no competing interests.

Ethical approval

Not required.

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