

Infectivity of Asymptomatic Versus Symptomatic COVID-19

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ABSTRACT

Recently COVID-19 has emerged as a possible threat to the human populace globally. Since then it has been spreading worldwide. The virus spreads rapidly and can cause fatal damage to the respiratory system hence has been declared a pandemic. Average time period of the SARS-CoV-2 virus can often be up to 14 days. The virus essentially affects the respiratory system, although there may be involvement of other organs too. Studies have identified that virus attaches itself to the Angiotensin 2 receptors (ACE-2) present in the host's body to enter the respiratory mucosa. Infection can either be acquired by inhalation of some infected air droplets or by touching contaminated surfaces (by the air droplets) and then touching individual's mouth, nose and eyes. Common symptoms include cold, cough, fever, body ache but there can be asymptomatic infections too. Asymptomatic individuals can also infect other individuals and are difficult to trace. Lack of uniformity in pattern of results of laboratory and radiological tests of the carriers who are asymptomatic increases the problem as some of them can have totally normal chest CT scan and other laboratory reports. Many methods like contact tracing has been adopted to trace such individuals. At present, prevention and treatment of the asymptomatic carriers should be of importance. In the high risk settings and high risk population dual detection systems including detection of the serum antibodies and nucleic acids is suggested with quarantine for a minimum of 14 days following the diagnosis as an asymptomatic carrier.

Key words: Symptomatic, Asymptomatic, Coronavirus, Quarantine, Respiratory mucosa

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INTRODUCTION

Thousands to millions of people have died as a result of many diseases and pandemics across the world. Despite medical and scientific progress, emerging infections continue putting human lives and the healthcare system at jeopardy. SARS-CoV-2 is a new Coronavirus which was originally discovered in Wuhan, central China and it is the cause of the current pandemic. Coronaviruses are one of the common respiratory microorganisms causing diseases in humans round the world [1]. Near the ending of 2019, 6 distinct Coronaviruses transmissible to humans were reported [2,3]. WHO declared "Coronavirus" as a brand new communicable disease on 11th February 2020 and considering its rapid global spread? WHO announced Coronavirus as a pandemic on 11th March 2020 [4].

To adopt adequate control plans and to help avoid future pandemics, it is critical to pinpoint the Coronavirus origin, its hosts and the evolutionary pathway. Unfortunately, the

actual genesis of SARS-CoV-2 is unknown, hence several explanations based on SARS-CoV-2 facts have been offered.

Bats were originally identified as hosts for Coronaviruses during the SARS pandemic in 2002 and interest rose in discovering additional possible animal hosts [5]. The bulk of initial SARS cases were in people who had intimate contact with animals, such as market civets. Before spreading to humans, the virus most likely acquired many mutations in market palm civets [6,7]. MERS-CoV-2 was also assumed to have a natural reservoir in bats, with dromedary camels being the intermediary hosts. MERS-CoV-2 was also assumed to have a natural reservoir in bats, with Arabian camels serving as intermediary hosts. Since then, bats have been revealed to be the hosts of at least 30 Coronaviruses with entire genomic sequences. This number might be underestimated because many more Coronaviruses are yet to be found or sequenced.

Average time period of the SARS-CoV-2 virus can often be up to 14 days [8]. The virus essentially affects the respiratory system, although there may be involvement of other organs too. Studies have identified that virus attaches itself to the Angiotensin 2 receptors (ACE-2) present in the host's body to enter the respiratory mucosa. Infection can either be acquired by inhalation of some infected air droplets or by touching contaminated surfaces

(by the air droplets) and then touching individual's mouth, nose and eyes.

MERS-CoV-2 and SARS-CoV-2 are both beta Coronaviruses and SARS-CoV-2 is one among them. The basic case reproduction rate of the COVID-19 virus ranges from 2 to 6.47 [9]. In comparison, the BCR of SARS (Severe Acute Respiratory Syndrome) virus was 2 and that of H₁N₁ 2009 was 1.3 [10].

LITERATURE REVIEW

Symptomatic vs. asymptomatic COVID-19

To begin, COVID-19 cases had been classified in to four categories: Mild, moderate, severe and extremely severe. However, evidence of asymptomatic COVID-19 infections, which can transmit the virus, is growing. Common symptoms include cold, cough, fever, body ache but there can be asymptomatic infections too [11]. Asymptomatic instances of COVID-19 are a likely origin of tremendous expansion inside a society [12]. However, minimal information is on the market approximately the infectivity fame and approximately the epidemiological significance of people who are asymptomatic.

Asymptomatic infections ask the testing of affected person samples and fine detection of SARS-CoV-2 macromolecules through RT-PCR. However do not display any classic scientific symptoms or symptoms or any evident abnormalities in radiological pix, along with lung Computerized Tomography (CT). In addition this populace has subpopulations: The pre-symptomatic populace and the folks that are real asymptomatic. Pre-symptomatic ones are people who show no signs but check advantageous for SARS-CoV-2 infection and in a while expand signs and symptoms whereas the actual asymptomatic ones are the humans that check nice for the contamination however never show any signs and symptoms or symptoms [13].

SARS-Coronavirus-2 testing is intended to note infection in both symptomatic and asymptomatic people. A variety of strategies are used. People in certain professions, for instance construction workers, marine workers and system industries workers, are tested once a week or biweekly and all near relatives of patients who test positive for COVID-19 are also assessed. Regardless of symptom fame, all COVID-19 case detections prompt public health measures, including touch tracing and as a result, quarantining of close contacts. A guy or woman who has modified within 2 metres of another man or woman is referred to as a near or close contact [14]. All quarantined humans are examined *via* PCR on the top in their confinement duration and are most effective released from their quarantine once they take a look at poor for COVID-19. Serological tests also are wiped out the general public who are inflamed, to work out the feasible duration in their COVID-19 infection, then to help with epidemiological inspections and isolation trials. Because the COVID-19 viral load is often larger before to seroconversion than after, it is assumed that seronegative patients are more infectious than seropositive cases [15].

Infectivity: Previous cross sectional researches showed no massive distinctness in transmission performance and viral titers had been located among symptomatic and asymptomatic sufferers. According to one research, asymptomatic individuals' viral burden approaches that of symptomatic patients [16]. Yet, none of the trials excluded pre-symptomatic people when it came to incubation time. Another study conducted in Korea with three pre-symptomatic individuals and ten asymptomatic vendors found that asymptomatic vendors may have a lower viral load throughout the incubation period than pre-symptomatic patients [17]. Hence, the transmission of asymptomatic carriers expected *via* the use of those researches can be expanded in comparison to the real facts. Eventually, growing proof indicates that cases with proper asymptomatic companies may additionally have a reduced threat of transmission than the symptomatic cases. A Wuhan survey of 12 asymptomatic providers found that just one service had transferred the virus to a close contact [18]. They followed nine asymptomatic firms and discovered that none of them had spread SARS-CoV-2 to others, leading them to assume that the lack of sneezing and coughing symptoms may obstruct viral transmission and reduce the risk of infection. Asymptomatic vendors' transmission capacity, on the other hand, cannot be overlooked, since some of them may also become super spreaders. These days, an asymptomatic provider ended in thirteen cases of secondary contamination, subsequently suggested as an asymptomatic super spreader [19].

Period of transmission of asymptomatic carriers

In Korea, researchers discovered that the average time span of viral drop in asymptomatic providers was 4-5 days and that each asymptomatic provider was nearly non-communicable after being isolated for 14 days [20]. Nevertheless, Hu et al. found that the average time for propagation was 9.5 days (possibly up to 21 days), implying that the definite duration of the infection can perhaps be prolonged given the specific date of the main contamination is unknown for some suppliers [21]. Tan, et al. colleagues found that among 12 asymptomatic carriers in Wuhan, the median length of virus dropping was about 11.5 (9-14) days, with two of them having favourable RNA repercussions lasting up to two months. SARS-CoV-2 can exist for up to two months in asymptomatic vendors, according to these investigations and firms with anomalous, the transmission interval for chest CT findings might be substantially longer.

Cohorts

Iceland: Researchers in the country, Iceland used subsequent strategies to display screen the overall population for COVID-19 contamination. Technique 1 covered an open invitation for fascinated people to check in online after which provide bio samples at a Reykjavik region while approach 2 covered a textual content message sent to "randomly selected individuals between the 20 and 70 years of age" inviting them to take part inside the same way because the first one. A total of 13080 humans volunteered for the screening, amongst

which 100 (0.8%) tested fantastic for COVID-19 contamination. the ones examined wonderful had been all elderly 10 years or older. Amongst those who examined wonderful, 43 (43%) people had no signs and symptoms of COVID-19 at the time of getting tested. "The indications virtually honestly evolved later in some of them," the researchers added [22].

Italy: An observation made at the start and conclusion of a 14 days isolation in the northern Italian city of Vo' by officials. The researchers tested swabs from the nasopharynx of 2812 Italian citizens throughout the primary sampling consultation and from 2343 citizens throughout the second session; which represented 85.9% and seventy on 71.5%, respectively, of the whole Italian population. From the primary organization, 30 (41.1%) out of 73 folks that examined tremendous for the COVID infection had no signs and symptoms while from the second one group, 13 (44.8%) of 29 folks that examined tremendous had been pronounced to be asymptomatic. Consistent with the group of researchers, there was gap of round 2 weeks among the sampling of the two corporations inside which not a person of the asymptomatic individuals advanced any signs of COVID-19. Additionally, a study turned into performed by using touch tracing wherein the researchers found that many new instances of COVID-19 infection which appeared at some stage in the second one sampling were induced because of publicity to asymptomatic people [23].

New York city obstetric patients

314 postpartum women of two hospitals inside the big apple metropolis were examined for SARS-CoV-2 among March 22 and April 4, 2020. 33 (15.4%) ladies tested fantastic of which 29 (87.9%) women were found to be asymptomatic. "Fever progressed in three (10%) ladies just before their postpartum discharge (in which the median time of life was two days)," the researchers said. Two of these three sufferers, though, were presumed to have endomyometritis and they have been dealt with as a consequence [24].

Nursing staff in king county, Washington

A nursing team of workers who worked at a nursing institute for professionals in King County, Washington, in the month of February tested tremendous for SARS-CoV-2 on 1st March 2020 [25]. Following that, 76 (92.6%) of the nursing facility's out of 82 were tested on March thirteen 2020; of which 23 (30.3%) examined effective at the time of testing, 12 (52.2%) of the 23 COVID advantageous team of workers were asymptomatic. Later on 19th and 20th March 2020, 49 workforces have been retested, consisting of people with previously received poor consequences and people with tremendous results however who either were asymptomatic or had bizarre signs. In the second round of testing, 24 nursing personnel participants (49.0%) obtained positive findings, with 15 (63.5%) of them being confirmed asymptomatic. After an average of four days of observation, 24 (88.9%) of the 27 persons who were

previously asymptomatic developed COVID-19 contaminated signs and symptoms.

DISCUSSION

Challenges, prevention and control

The ability to control COVID-19 infection relies on the early popularity of an infected individual and the ability to set aside the path of transmission. Infected persons can spread the disease by releasing air droplets (which are released when someone coughs or sneezes) that are ingested or inhaled by people nearby. The successful isolation of stay virus from throat swabs differs significantly from SARS, indicating that replication of the Coronavirus in the upper respiratory system is active and that it is more potent than SARS-CoV-2 in view of spread through active pharyngeal virus shedding [26]. A group of German research team contributors determined that a few human beings with COVID-19 may also have high stages of virus of their throat swabs even whilst their preliminary signs and symptoms were mild, which means that that the pathogen is quickly released and then transmitted to others through droplet transmission [27]. This also way that the protecting measures that consists of wearing protecting mask, can save you the infection with new Coronavirus to a positive extent. However, most of the asymptomatic people do no longer are searching for any medical help because of poor preventive recognition and shortage of any obvious medical symptoms, which make contributions to the fast unfold of COVID-19. Therefore, it's far a splendid task to save you and manipulate these precise varieties of sufferers globally, which needs greater interest worldwide. Furthermore, the primary route of SARS-CoV-2 transmission is through aerosols breathed by asymptomatic COVID-19 vendors during the act of breathing and speaking and cases of familial transmission *via* asymptomatic patients have been reported in certain international locales.

Identification of asymptomatic carriers

Symptomatic companies as an unseen source of contamination can transmit virus, that is a fantastic assignment for prevention and manipulate of the COVID-19 infection. Along with the significance of enforcing social spacing plans and the use of masks, it's also critical to identify and isolate asymptomatic businesses as soon as possible. It's still unclear how asymptomatic providers can be diagnosed early. At current moment, nucleic acid, serum antibody testing and CT chest anomalies are used to diagnose SARS-CoV-2 viral infection. Because asymptomatic carriers' chest CT scan results are prevalent (particularly among the younger population), the current investigation solely revealed the finding of nucleic acids and antibodies to COVID-19. Nucleic acid detection, despite its widespread usage, has been demonstrated to have low sensitivity and high fake bad costs, according to studies [28,29]. In sputum samples, nose swabs and throat swabs, the effective results of RT-PCR detection were seventy 4.49%, 53.6-73.3% and 29.6-sixty 1.3%, respectively [30]. The

sensitivity and specificity of the fast IgM-IgG blended antibody screening were found to be 88.7% and 90.6%, respectively. There may be additional proof that the sensitivity of overall antibodies is greater in comparison to that of IgM or IgG by myself. A look at completed with 908 individuals diagnosed that the asymptomatic contamination fee showed *via* RT-PCR by myself become 4.2%, even as with mixed RT-PCR take a look at and serological detection was 9.7%.

A combination of serum antibody testing and nucleic acid testing is recommended [31], taking into consideration the available information, to identify asymptomatic carriers in high danger settings or groups. All asymptomatic suppliers should be isolated and observed for at least 14 days or until two negative nucleic acid test results are received within 24 hours of one other. Few studies on related aspects of COVID-19 were reviewed [32-46].

CONCLUSION

According to this study, which is based primarily on the literature, the percentage of asymptomatic SARS-CoV-2 donors varies significantly between investigations. Age may also play a role in asymptomatic infection. It's also feasible that the proportion of young people who are asymptomatic sellers may rise. Controlling asymptomatic carriers should be a top focus in epidemic prevention, particularly in nations where outbreaks are severe. In high risk places and populations with an excessive chance population, dual detection of blood antibodies and nucleic acids with quarantine for at least 14 days is suggested following identification as an asymptomatic carrier.

REFERENCES

1. Paules CI, Marston HD, Fauci AS, et al. Coronavirus infections more than just the common cold. *JAMA* 2020; 323:707-708.
2. Lu R, Zhao X, Li J, et al. Genomic characterisation and epidemiology of 2019 novel Coronavirus: Implications for virus origins and receptor binding. *Lancet* 2020; 395:565-574.
3. Qiang X, Xu P, Fang G, et al. Using the spike protein feature to predict infection risk and monitor the evolutionary dynamic of Coronavirus. *Infect Dis Poverty* 2020; 9:33.
4. Livingston E, Bucher K, Rekito A, et al. Coronavirus disease 2019 and influenza 2019-2020. *JAMA* 2020; 323:1122.
5. Wong ACP, Li X, Lau SKP, et al. Global epidemiology of bat Coronaviruses. *Viruses* 2019; 11:174.
6. Cui J, Li F, Shi ZL. Origin and evolution of pathogenic Coronaviruses. *Nat Rev Microbiol* 2019; 17:181-192.
7. Zheng J. SARS-CoV-2: An emerging Coronavirus that causes a global threat. *Int J Biol Sci* 2020; 16:1678-1685.
8. Cheng ZJ, Shan J. 2019 Novel Coronavirus: Where we are and what we know. *Infection* 2020; 48:155-163.
9. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel Coronavirus in Wuhan, China. *Lancet* 2020; 395:497-506.
10. Zou L, Ruan F, Huang M, et al. SARS-CoV-2 viral load in upper respiratory specimens of infected patients. *N Engl J Med* 2020; 382:1177-1179.
11. Tabata S, Imai K, Kawano S, et al. Clinical characteristics of COVID-19 in 104 people with SARS-CoV-2 infection on the diamond princess cruise ship: A retrospective analysis. *Lancet Infect Dis* 2020; 20:1043-1050.
12. Kronbichler A, Kresse D, Yoon S, et al. Asymptomatic patients as a source of COVID-19 infections: A systematic review and meta-analysis. *Int J Infect Dis* 2020; 98:180-186.
13. World Health Organization (WHO). Coronavirus disease 2019 (COVID-19) situation report, 73. 2020.
14. Yong SEF, Anderson DE, Wei WE et al. Connecting clusters of COVID-19: An epidemiological and serological investigation. *Lancet* 2020; 20:809-815.
15. Peeling RW, Weddenburn CJ, Garcia PJ, et al. Serology testing in the COVID-19 pandemic response. *Lancet* 2020; 20:e245-e249.
16. Zou L, Ruan F, Huang M, et al. SARS-CoV-2 viral load in upper respiratory specimens of infected patients. *N Engl J Med* 2020; 382:1177-1179.
17. Kim SE, Jeong HS, Yu Y, et al. Viral kinetics of SARS-CoV-2 in asymptomatic carriers and pre-symptomatic patients. *Int J Infect Dis* 2020; 95:441-443.
18. Tan F, Wang K, Liu J, et al. Viral transmission and clinical features in asymptomatic carriers of SARS-CoV-2 in Wuhan, China. *Front Med* 2020; 7:547.
19. Yu X, Ran D, Wang J, et al. Unclear but present danger: An asymptomatic SARS-CoV-2 carrier. *Genes Dis* 2020; 7:558-566.
20. Kim SE, Jeong HS, Yu Y, et al. Viral kinetics of SARS-CoV-2 in asymptomatic carriers and pre-symptomatic patients. *Int J Infect Dis* 2020; 95:441-443.
21. Hu Z, Song C, Xu C, et al. Clinical characteristics of 24 asymptomatic infections with COVID-19 screened among close contacts in Nanjing, China. *Sci China Life Sci* 2020; 63:706-711.
22. Gudbjartsson DF, Helgason A, Jonsson H, et al. Spread of SARS-CoV-2 in the Icelandic population. *N Engl J Med* 2020; 382:2302-2315.
23. Lavezzo E, Franchin E, Ciavarella C, et al. Suppression of COVID-19 outbreak in the municipality of Vo, Italy. *MedRxiv* 2020.

24. Sutton D, Fuchs K, D'Alton M, et al. Universal screening for SARS-CoV-2 in women admitted for delivery. *N Engl J Med* 2020; 382:2163-2164.
25. Arons MM, Hatfield KM, Reddy SC, et al. Public health Seattle and king county and CDC COVID-16 Investigation Team. Presymptomatic SARS-CoV-2 infections and transmission in a skilled nursing facility. *N Engl J Med* 2020;382:2081-2090.
26. Wölfel R, Corman VM, Guggemos W, et al. Virological assessment of hospitalized patients with COVID-2019. *Nature* 2020; 581:465-469.
27. Rothe C, Schunk M, Sothmann P, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. *N Engl J Med* 2020; 382:970-971.
28. Zhao D, Wang M, Wang M, et al. Asymptomatic infection by SARS-CoV-2 in healthcare workers: A study in a large teaching hospital in Wuhan, China. *Int J Infect Dis* 2020; 99:219-225.
29. Lu S, Lin J, Zhang Z, et al. Alert for non-respiratory symptoms of Coronavirus disease 2019 patients in epidemic period: A case report of familial cluster with three asymptomatic COVID-19 patients. *J Med Virol* 2021; 93:518-521.
30. Yang Y, Yang M, Shen C, et al. Laboratory diagnosis and monitoring the viral shedding of SAR-CoV-2 infections.
31. Gao WJ, Zheng K, Ke J, et al. Advances on the asymptomatic infection of COVID-19. *Chin J Epidemiol* 2020; 41:990-993.
32. Acharya S, Shukla S, Acharya N. Gospels of a pandemic-A metaphysical commentary on the current COVID-19 crisis. *J Clin Diagn Res* 2020; 14:OA01-OA02.
33. Arora D, Sharma M, Acharya S, et al. India in "flattening the curve" of COVID-19 pandemic Triumphs and challenges thereof. *J Evol Med Dent Sci* 2020; 9:3252-3255.
34. Bawiskar N, Andhale A, Hulkoti V, et al. Haematological manifestations of COVID-19 and emerging immuno haematological therapeutic strategies. *J Evol Med Dent Sci* 2020; 9:3489-3494.
35. Burhani TS, Naqvi WM. Tele health a boon in the time of COVID-19 outbreak. *J Evol Med Dent Sci* 2020; 9:2081-2084.
36. Butola LK, Ambad R, Kute PK, et al. The pandemic of 21st century COVID-19. *J Evol Med Dent Sci* 2020; 9:2913-2918.
37. Dhok A, Butola LK, Anjankar A, et al. Role of vitamins and minerals in improving immunity during COVID-19 pandemic-A review. *J Evol Med Dent Sci* 2020; 9:2296-2300.
38. Gawai JP, Singh S, Taksande VD, et al. Critical review on impact of COVID-19 and mental health. *J Evol Med Dent Sci* 2020; 9:2158-2163.
39. Khubchandani SR, Dahane TM. Emerging therapeutic options for COVID-19. *J Evol Med Dent Sci* 2020; 9:3082-3085.
40. Kolhe S, Dambhare M, Dhankasar P, et al. Home remedies during COVID pandemic lockdown. *J Evol Med Dent Sci* 2020; 8:103-107.
41. Pate BS, Yeola ME, Gawande A, et al. Best practices for endoscopic procedures in COVID-19 pandemic. *J Evol Med Dent Sci* 2020; 9:3760-3766.
42. Patel A, Patel S, Fulzele P, et al. Quarantine an effective mode for control of the spread of COVID19? A review. *J Family Med Prim Care* 2020; 9:3867-3871.
43. Sigh N, Anjankar AP, Garima S. The urgent need to understand COVID-19 associated coagulopathies and the significance of thrombotic prophylaxis in critically ill patients. *J Evol Med Dent Sci* 2020; 9:2381-2385.
44. Soorthy MS, Pratapa SK, Mahant S. Mental health problems faced by healthcare workers due to the COVID-19 pandemic-A review. *Asian J Psychiatr* 2020; 51.
45. Jakhar D, Sharma A, Kaur I, et al. Indian dermatologists wield technology to combat COVID-19. *Indian Dermatol Online J* 2020; 11:991-994.
46. Kute V, Guleria S, Prakash J, et al. NOTTO transplant specific guidelines with reference to COVID-19. *Indian J Nephrol* 2020; 30:215-220.