

Public health implications of transmissions of COVID-19 while cases asymptomatic: a literature review

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Abstract

Corona Virus Disease 2019 is an RNA virus that currently affecting more than 210 countries, more than 3,221,617 cases, and 228,263 deaths are reported till April 28, 2020. There is a knowledge gap regarding the incidence proportion of asymptomatic and symptomatic infection so that public health interventions can be reviewed. We searched the original articles in google Scholar for articles that were published from January 1 through May 5 2020, and country updated reports of coronavirus disease. Finally, reviewed to compile and make conclusions. Different epidemiologic studies support the possibility of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) detected could able to transmit during the asymptomatic state. SARS-CoV-2 transmission in the absence of symptoms reinforces the value of measures that prevent the spread of SARS-CoV-2 by infected persons who may not exhibit illness despite being infectious. The existence of persons with asymptomatic SARS-CoV-2 infection who are capable of transmitting had many implications. The case-fatality rate for COVID-19 may be lower or inaccurate, reinforces the value of community interventions, and could enhance the need to increase the capacity for widespread testing and thorough contact tracing.

Background

According to the World Health Organization (WHO), viral diseases continue to emerge and become a serious issue to public health. Several viral epidemics such as the severe acute respiratory syndrome coronavirus (SARS-CoV-2) in 2002 to 2003, H1N1 influenza in 2009, and Middle East respiratory syndrome coronavirus (MERS-CoV-2) which was first identified in Saudi Arabia in 2012, are threatening the world in the last twenty years. In a timeline, an epidemic of cases with unexplained low respiratory infections detected in Wuhan, China emerged at the beginning of December 2019. The disease was reported to WHO on December 31, 2019, and WHO launched the disease in Corona Virus Disease-2019(COVID-19). The disease is declared as international concern public health risk on January 30, 2020(1).

Coronavirus Disease 2019 is currently affecting more than 210 countries worldwide. According to the report on April 28, 2020, around 3,221,617 cases and 228,263 deaths recorded globally. According to these figures, the case fatality rate (CFR) is around 7% even the rate is varied across countries(2). With the presence of a great trade relationship between Africa and China, and with the absence of equipped and modern public health system, Africa is in a greater risk of introduction and spread of the disease(3). According to WHO COVID-19 updated report on April 29, 2020, there are 36,456 confirmed cases and 1,586 deaths in Africa, 130 case and three deaths in Ethiopia (4). Major factors contributed to the high spread of COVID-19 are the economic status of the populations (5), populations mobility and travel(6, 7), human behavior like stay at home, use of face masks, frequent handwashing practice, eye/mouse touching habits, and habit of using bar fingers to remove mucous from the nose (8), asymptomatic nature of segments of patients(9). Countries like Italia, Spain, and others are seriously harmed and paid value by the coronavirus. This was because of the negligence of the people in practicing of COVID-19 prevention instructions from the government(10, 11). By considering the urgency of the pandemic, this review aimed to provide evidence regarding public health

implications of SARS-CoV-2 while asymptomatic, which provide information for future research related to this topic and may support decision making on strategies to handle this public health emergency.

Search method

We searched the literature in Google Scholar and PubMed for articles that were published from January 1 through May 5 2020. Searching was concerned with asymptomatic coronavirus 2 (SARS-CoV-2) implications. We used combinations of the search terms SARS-CoV-2, COVID-19, Corona Virus, asymptomatic, presymptomatic, transmission, and implication. “AND”, and “OR” Boolean operators were used to combine the search terms especially in PubMed advanced searching. We included original articles, brief reports, and correspondences and excluded reviews, commentaries, opinions, and preprint manuscripts. We classified studies as reporting epidemiology, geographic distribution, and timing of asymptomatic implications of SARS-CoV-2.

Epidemiology of the infection

Majority of the reports presented worldwide are asymptomatic cases, which are typically exposed to SARS-CoV-2 during travel from Wuhan (12, 13), and living together(13, 14). Estimation of the asymptomatic ratio of novel coronavirus (COVID-19) cases, a study in China revealed that around 42% of evacuated citizens were asymptomatic. This figure could reach 67% and unless RNA-PCR or other laboratory tests done, it was impossible to identify as cases(15). One 17 years old young in Bahir Dar Ethiopia on 04/May 2020, and another person in Southern Nations Nationalities, Ethiopia found as SARS-CoV-2 positive were asymptomatic cases (16). Many experts believe that unnoticed, asymptomatic cases of coronavirus infection could be an important source of contagion. From a total of 166 new infections in China in April 2020 more than half 130(78%) were identified as asymptomatic(17). Of course, this proportion is not a real scientific indication based on the world health organization report (18). Before becoming symptomatic, this person exposed to two other colleagues who subsequently received a COVID-19 diagnosis but did not have contact with the primary patient from any other sources. A report from Singapore described seven COVID-19 clusters resulting from the presymptomatic transmission; presymptomatic primary patients varied from persons with travel from high-incidence countries to persons exposed in the local community, a very challenging indication of SARS-CoV-2 transmission during presymptomatic stage(19). A cluster of cases who have travel history traced their contacts before signs and symptoms. Based on tracing and diagnosis reports, individuals who had no travel history also contracted the disease. This indicates that the asymptomatic cases are the potential source of transmission of SARS-CoV-2(14). Similarly, cases of presymptomatic transmission have been reported from other countries before widespread community transmission occurred. A report from Germany, documented infection of a German businessman after exposure to a mildly symptomatic colleague visiting from China (20). This ability of transmission of SARS-CoV-2, while a person is asymptomatic, was ascertained by different virologic and modeling studies in different areas (9). The incubation periods for asymptomatic primary patients with distinct exposures ranged from 3 to 14 days; sometimes it will last to 21 days(21, 22), the basic reproductive number(R_0) COVID-19 is also higher than the previous SARS epidemics (23), but this number is higher than 6.5 in other studies done using stochastic methods(24-28). Therefore, it can be concluded as all primary patients experienced different periods of initial exposure and asymptomatic close contact with secondary patients who have no other known exposure risks.

Public health implications of transmissions during asymptomatic period

According to different kinds of literature and scientific pieces of evidence, the existence of persons with asymptomatic SARS-CoV-2 infection who are capable of transmitting the virus to others has so many implications. Because many SARS-CoV-2 cases are recovering without showing signs and symptoms (29), the attack rate and case-fatality rates of COVID-19 might be lower or inaccurate related to currently estimated ratios, if asymptomatic SARS-CoV-2 infections are included (30, 31). This is the first implication that should be introduced during the surveillance and reporting of SARS-CoV-2 in each country. The second and the very important implication to slow the transmission of COVID-19 is transmission while asymptomatic reinforces the value of community interventions. Clearly understanding of the asymptomatic transmission is

possible and even risk. Center for Diseases Prevention and Control (CDC) and WHO recommended that the very important intervention method is physical distancing(32, 33), use of face-covering materials like cloth in public places (34), and universal masking in healthcare facilities(35) to prevent SARS-CoV-2 transmission by asymptomatic and symptomatic persons. Third but might not be the final implication of asymptomatic transmission is that it could enhance the need to increase the capacity for widespread testing and thorough contact tracing to detect asymptomatic infections, interrupt undetected transmission chains, and further curve down the epidemic curve. Contact tracing (36-38), and implementation of multipronged surveillance and containment measures(39) are the key approaches for limiting the transmission rate.

Scientific lessons to be shared for public health actions

The occurrence of SARS-CoV-2 is international public health issue (40-42), economic (43), and other concerns currently. Since the worlds' population is terrorized in acquiring SARS-CoV-2, the need decreased to visit the health institutions; they are being suffered by non-COVID-19 diseases. A press release of the Federal Ministry of Health, Ethiopia, assuring this fact, in which the ministry of health expressed that the numbers of patient flow were decreasing. Also, there were private and governmental health institutions closed the normal service because of the COVID-19 pandemic(44). Therefore, with the high transmission rate of SARS-CoV-2 while asymptomatic raises the public health practitioners should consider; one thing; serial virologic, serologic data, or a combination of both in observational cohorts or surveillance systems studies should be conducted to clarify the magnitude of asymptomatic infections of SARS-CoV-2. This can be used to compare numbers of asymptomatic and symptomatic infections; if asymptomatic cases are high proportion, it enhances disease detecting strategies. Second, if large proportions of SARS-CoV-2 is from asymptomatic infection, the effectiveness of public health interventions like physical distancing, contact tracing, quarantine of different group of populations, which are aimed to reduce the spread of infection(45) should be quantified. However, in the presence of different attitudes of people, the culture of populations, and economic status, it is very difficult to conclude contact tracing is a perfect prevention measure(36, 46). Therefore, if the COVID-19 pandemic is found to be ambitious by undetected asymptomatic SARS-CoV-2 infections, new innovations in disease detection and prevention may be needed to be introduced in each country. Last but not the least, knowledge of SARS-CoV-2 immunity among persons with asymptomatic or symptomatic infection is not still fully or partially studied. Immunity developed in these persons, how long protective immunity lasts, and if there will be reinfection, and if there will be carrier state are not well clarified(47). These types of evidences are vital for healthcare and other critical infrastructure workers; the answers to these questions will be decisive to decide relaxing of community interventions, resuming the normal functions of society, recovering from the COVID-19 pandemic, then after to make this disease be history as the previous pandemics.

Conclusion

We assessed the public health implication of transmission of SARS COV2 asymptomatic cases. The presence of persons with asymptomatic SARS-CoV-2 infection who are capable of transmitting had many implications. The case-fatality rate for COVID-19 may be lower or inaccurate with the presence of asymptomatic cases. This reinforces the value of community interventions and could enhance the need to increase the capacity for widespread testing and thorough contact tracing. Thus, it is recommending that the scholarly community conduct further research to provide valid and reliable ways to manage this kind of public health emergency in both the short term and long-term.**Declarations Ethics approval and consent to participate**

We contacted the corresponding authors of the original articles which are not accessed on open access way to obtain the full text of the article.

Consent for publicationNot applicable**Availability of data and materials**All other necessary data are included in the manuscript.**Competing interests**The authors declared that they have no competing interest**Funding** This investigation received no specific grant from funding agency in public commercial, or for profit sectors.**Authors contributions**WMA, ETA, and TBT were authors involved in the design, implementation, searching of literature resources, reviewing and narrating of the findings. All authors have read and approved the manuscript.**Acknowledgments**

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