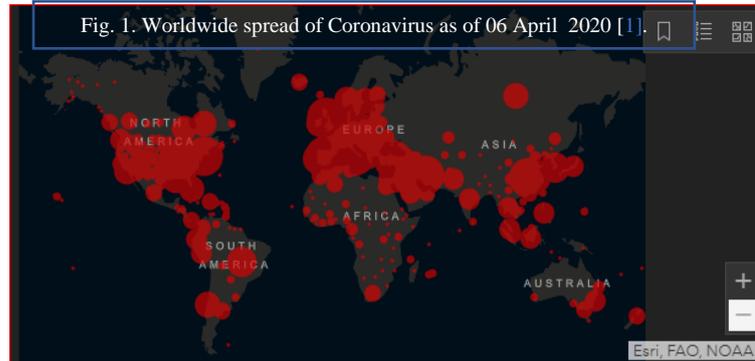


Corona virus (COVID-19): Two Selected Research Questions!

Golam Kibria Ph.D

COVID-19 is a coronavirus identified as the cause of coronavirus disease 2019 (COVID-19) that started in Wuhan, Hubei Province, China in December 2019, and spread worldwide (as of 6 April 2020, there were 1,274,923 infection, 69,479 deaths spread over 183 countries/region according to John Hopkins University [1]. Coronavirus is an RNA virus. Researchers suspect that COVID-19 may have come from bats to human.

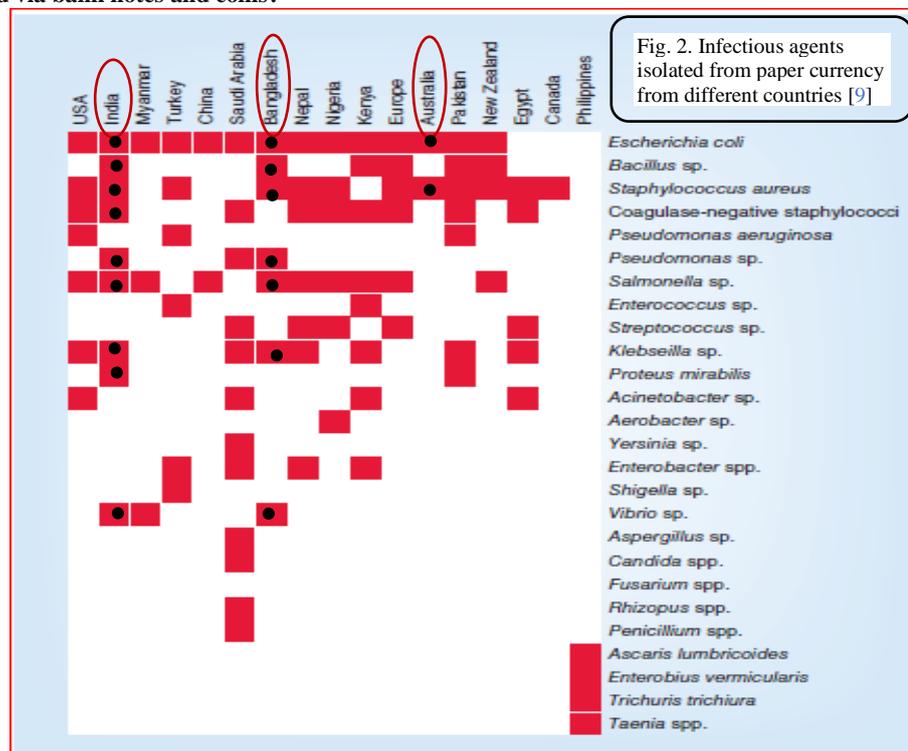


1. Whether COVID-19 infection rate be reduced by high temperatures and high humidity?

Epidemiologists used the term R_0 (“R naught”) to describe the infection rate (R_0 is a mathematical term to indicate how contagious an infectious disease is). The R_0 of COVID-19 is 2.0-2.5 (average 2.2) (meaning an infection rate of 2.2 people can occur from an infected person) according to the World Health Organisation. Compared to COVID-19, the R_0 value for the seasonal flu (influenza) is 1.3 [2]. Based on R_0 values, COVID-19 is more contagious/transmittable than seasonal flu or influenza. It is known that influenza virus transmission is dependent on temperature and humidity. Researchers reported that the transmission rate of the influenza virus was high at lower temperature and at a lower relative humidity [3, 4]. In fact, human coronaviruses that cause common cold symptoms displays strong during winter months and are undetectable in summer months in temperate regions [5]. Very recently, few researchers have started to carry out some research whether temperature and humidity could have some roles in the transmission of COVID-19. According to one research, one-degree Celsius increase in temperature and one per cent increase in relative humidity could lower transmission of Novel coronavirus COVID-19 by 0.0225 and 0.0158, respectively [6]. The other researchers also made the same conclusion that warm, humid weather could slow coronavirus [7,8]. This could be good news where the high temperature and high humidity rise is expected very soon such as in the Northern Hemisphere and the Indian Sub-continent.

2. Can coronavirus be spread via bank notes and coins?

Both banknotes and coins offer ample surface area to harbour bacteria and microorganisms. In particular, paper currency (cotton based used in Bangladesh, India), offers a surface area for various bacteria and microorganisms [9,10, Fig. 2] to reside on both sides. Polymer-based banknotes (used in Australia, New Zealand) contained significantly lower bacterial counts than cotton-based banknotes (see Fig. 2, [9]. Whether corona infected known or unknown patients could pass on Coronavirus (COVID-19) through handling cash and using it to buy things requires further research and investigations. Perhaps, in the current situation, electronic transactions or washing hands after handling of money are the safe and best practices.



References

1. John Hopkins University, COVID-19 map, Coronavirus COVID-19 Global Cases by the Center for Systems Science and Engineering (CSSE) <https://coronavirus.jhu.edu/map.html> (accessed 6 April 2020)
2. <https://www.telegraph.co.uk/global-health/science-and-disease/number-one-important-covid-19-sweeps-britain/>.

3. Lowen AC and John Steel J 2014 Roles of humidity and temperature in shaping influenza seasonality_DOI: 10.1128/JVI.03544-13
<https://jvi.asm.org/content/88/14/7692>
4. Coronavirus expert says he knows when the virus 'will burn itself out,' according to leaked analysis
<https://www.accuweather.com/en/health-wellness/coronavirus-expert-says-the-virus-will-burn-itself-out-in-about-6-months/679415>
5. Gaunt ER, Hardie A, Claas EC et al 2010 Epidemiology and clinical presentations of the four human coronaviruses 229E, HKU1, NL63, and OC43 detected over 3 years using a novel multiplex real-time PCR method. *J Clin Microbiol* **48(8)** 2940-2947
6. Wang J, Tang K, Feng K et al 2020 High temperature and high humidity reduce the transmission of COVID-19
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3551767
7. No need to panic, COVID-19 is something we can easily conquer: Padma Bhushan Dr D Nageshwar Reddy
<https://www.newindianexpress.com/lifestyle/health/2020/mar/29/no-need-to-panic-covid-19-is-something-we-can-easily-conquer-medical-expert-dr-d-nageshwar-reddy-2123093.html>
8. Sajadi MM, Habibzadeh P, Vintzileos A et al 2020 Warm, humid weather could slow coronavirus, new research find.
<https://www.washingtonpost.com/weather/2020/03/24/warm-humid-weather-coronavirus/>
9. Angelakis E, Azhar EI, Bibi F et al 2014 Paper money and coins as potential vectors of transmissible disease *Future Microbiol* **9(2)** 249–261
10. Marin DF 2017 Dirty money The public health case for a cashless society. *Scientific Americana* <https://www.scientificamerican.com/article/dirty-money/>