

Social distancing: A non-pharmacological intervention for COVID-19

Piryani Rano Mal,¹ Piryani Suneel,² Piryani Shomeeta³

Abstract

Social distancing is one of the non-pharmacological measures to contain the infection of COVID-19. At this point in time, no vaccine is available to prevent the infection, no effective drugs are available to prevent and treat the disease, and none of the communities have acquired herd immunity. Various models have shown positive impact of social distancing, provided its implementation on vast majority of the population over a long period of time. Its effect is manifold. Besides flattening the curve, it impacts the political, fiscal, social, economic aspects of the society, along with socially vulnerable and economically underprivileged population. It becomes obsolete after the population develops herd immunity subsequent to widespread infection in the community, or after effective mass immunisation or specific drugs for its control, cure and prevention are available widely.

Keywords: COVID-19, Infections, Social distancing.

DOI: <https://doi.org/10.5455/JPMA.05>

Interventions to Control, Prevent and Eradicate Infectious Diseases

There are two important interventions to control, prevent and eradicate infectious diseases; pharmacological measures such as vaccines and medicines, and non-pharmacological methods such as hand-washing, access to safe drinking water, and social distancing. With the emergence of new infections, only non-pharmacological interventions are in the hands of healthcare professionals and social scientists to contain the infection till pharmacological options are available. Social distancing is one such way.^{1,2} At the time of this writing, no specific vaccine is available for mass vaccination for prevention of coronavirus disease (COVID-19), and no specific drugs are available to treat

the disease and minimise its transmission.³ To prevent an unprecedented intensity of global infectious disease pandemic, public participation is crucial in reducing transmission and spread. World Health Organization (WHO) recommends fundamental public health measures such as proactive surveillance for rapid detection of cases, rapid diagnosis of cases and immediate case isolation, thorough tracking and quarantine of close contacts, exceptionally high degree of public awareness, and acceptance of these non-pharmacological measures.⁴

Social Distancing

Social distancing refers to minimising physical contact between individuals. From public health perspective, social distancing reduces or interrupts the possibility of transmission of infectious diseases especially ones which rapidly transmit through respiratory passages and with contact. Social distancing applies at individual level, and includes isolation of patients, quarantine of contacts, and stay-at-home advice. It also applies at public level, with measures such as closure of educational institutions and workplaces, cancellation of mass gatherings, limiting meetings of special populations, and mandatory quarantine of residential areas or buildings.¹

COVID-19 Pandemic

The ongoing COVID-19 pandemic is due to infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). WHO declared COVID-19 a global pandemic on March 11, 2020 with the exponential rise of infection affecting all WHO regions.² The pandemic has grown rapidly in 14 weeks' time since the first case of severe pneumonia reported to WHO by Chinese authority.⁵

As of 12th April 2020, COVID-19 is affecting 210 countries, territories, and 2 international conveyance around the world, with 1,852,365 reported cases and 114,196 deaths.⁶ The pandemic is accelerating at an alarming pace. The first one hundred thousand cases were reported in 67 days, the second one 11 day later, then third one 4 days later, fourth one reported 3 days later, the fifth one 2.5 days later, and the sixth one 2 days later.⁶

¹Department of Internal Medicine and Chief Coordinator - Health Professions Training Committee, Coordinator COVID-19 Task Committee, Universal College of Medical Sciences, Bhairahawa, Nepal, ²Public Health Consultant, Karachi, Pakistan, ³Consultant Radiologist, Memon Medical Institute, Karachi, Pakistan.

Correspondence: Piryani Rano Mal. Email: rano.piryani@gmail.com

Till date, there is no vaccine for prevention of COVID-19, nor drugs to treat interstitial pneumonitis leading to severe acute respiratory distress syndrome (ARDS). It may take months for these to be available; only non-pharmacological interventions are available to avoid infection such as practice of good personal hygiene habits (hand-washing, coughing into tissue or elbow, avoiding touching eyes, nose and mouth) and social distancing.^{2,5}

Mode of Transmission of COVID-19

There are two main routes of transmission i.e. respiratory droplets and contact. The respiratory droplets are usually produced when infected person coughs or sneezes. Persons within one meter of infected person are at high risk of getting infected (through droplet) and touching the surface close to the infected person (through contact) increases the risk to get infected if s/he touches his/her eyes, nose or mouth.⁷ This is the rationale to keep more than one meter distance between individuals so as to minimise the chances of getting droplet infection.

Modelling Regarding Social Distancing

An agent-based model for a fine-grained computational simulation of the ongoing COVID-19 pandemic was developed in Australia. According to the model, compliance at the 90% level is likely to control the disease within 13-14 weeks while compliance below 70% is unlikely to succeed for any duration of social distancing.⁵

Koo et al adapted an influenza epidemic simulation model to estimate the likelihood of human-to-human transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). They reported that a combined approach comprising of quarantine for infected patients and their families, school closure, and workplace distancing is effective and could prevent 99.3% of infections compared with baseline scenario.^{5,8}

A study done by Indian Council of Medical Research (ICMR) using mathematical model estimated India may be able to reduce its COVID-19 cases up to 62% if social distancing and quarantine guidelines are strictly followed.⁹

Impact of Social Distancing

The aim of social distancing is to flatten the curve i.e. to reduce and delay the peak of epidemic and safeguard the capacity of healthcare and other stakeholders. The impact of social distancing depends on how quickly the

measures are taken, and on the local epidemiological situation, but there is no one-size-fits-all method on taking decision.^{1,10}

The measures taken must be decisive, swift, coordinated and comprehensive. Authorities have to face challenges when social distancing methods are adapted and implemented such as social and political issues, human rights issues, communication with public, countering stigma, financial and social support to affected persons and communities, support to vulnerable and socially deprived people, compensation of lost income, continuation of supply, adjustment of businesses, and impact evaluation.¹

Social distancing measures become obsolete once sufficient herd immunity is developed in community, effective mass vaccination program is implemented, or effective drugs are available for control, cure and prevention.¹

Grading of Social Distancing

WHO, John Hopkins University and Center for Disease Control and Prevention (CDC), USA all claim that social distancing is one of the best interventions to contain the spread of COVID-19. Unacast, USA, a mobility tracking service is using their technology to determine which states and counties are adhering social distance practices.¹² They have developed three proxy measures:

1. Change in average distance travelled compared to a pre-COVID period,
2. Change/reduction in visits to non-essential venues compared to a pre-COVID period, and
3. Human encounters.

They have developed A-F grading system for travel:

- A- travel decreased by > 70%,
- B- travel decreased by 55-70%,
- C- travel decreased by 40-55%,
- D- travel decreased by 25-40%, and
- F- travel decreased by <25%.

The essential visits include visit to food stores, pet stores and pharmacies; other visits are non-essential. The human-reduction-encounter recommended by various studies and expert are: A > 94%, B 82-94%, C 74-82%, D 40-74% and F < 40%.^{11,12}

Evidence of Social Distancing with Regards to COVID-19

Quarantine, social distancing, and isolation of COVID-19 infected populations can contain the epidemic as

evident from Chinese experience.¹³ Ainslie et al have mentioned that social distancing enacted in China has led to control of COVID-19.¹⁴ It has been reported that non-pharmacological initiative including social distancing and travel restrictions in Singapore, Hong Kong, Taiwan and South Korea has cut the chain of transmission of COVID-19 and prevented exponential growth of virus.¹⁵ One of the five reasons for the exponential spread of COVID-19 in USA could be less strict social distancing measures.¹⁶

Social Distancing in Low to Middle Income Densely Populated Countries in COVID-19 Era

For combating the COVID-19 pandemic, social distancing has become the basic intervention and widely practiced in the world. Barnett-Howell et al explored whether similar mitigation and suppression strategies are equally justified in low and middle-income countries through epidemiological modelling. They concluded that social distancing measures are predicted to save large number of lives in high income countries like USA, China, while estimated benefits of social distancing are much lower in low and lower middle-income countries like Bangladesh, Pakistan, and Nigeria.¹⁸

They have reported that "poorer countries also have limited capacity to enforce distancing guidelines, and lock-downs may have counterproductive effects if it forces informal sector workers and migrants to reverse-migrate from densely-populated urban areas and spread the disease to remote rural areas of poor countries". The economic costs of distancing are very high especially burdens of socially deprived class.

It has been suggested that low-income countries adapt harm-reduction measures to minimise their risk from COVID-19. These are:

- 1) Universal mask wearing (homemade face masks or face coverings);
- 2) Targeted social isolation of elderly and other at-risk group within each house hold, in other words limited social distancing;
- 3) Improving access to clean water, hand washing and sanitation and other policies to decrease the viral load, and
- 4) Wide spread social influence and information campaign encourages behaviour change that slows the spread of disease.¹⁸

There could be negative consequences of social distancing like economic hardship (for example

people stay home and lose their jobs), social hardship (for example person may not have access to normal social support), inadequate public compliance (for example difficult to comply by the people for longer period requires police intervention) and limited public health benefits (for example if social distancing started late, then there may not have desired benefits).¹⁹

Conclusion

Social distancing is a non-pharmacological measure besides others. This is not only the measure to contain COVID-19 infection. It may help in reducing transmission from people who are unaware that they are infected. It flattens the curve, so healthcare authorities, scientists, vaccine developer and manufacturer, drug developers and manufacturer, other stakeholders to get time to strengthen their capacity and cope with epidemic without becoming overwhelmed.

It is estimated that social distancing policies produce smaller benefits to low-income to lower middle income densely populated countries than high income countries. Social isolation, in other words limited social distancing, measures may be of help to minimise COVID-19 spread in low-income to lower middle-income countries.

References

1. European Centre for Disease Prevention and Control. Considerations relating to social distancing measures in response to COVID-19 - second update. [Internet] Stockholm: ECDC; 2020. [cited 2020 Apr 02]
2. Lewnard JA, Lo NC. Scientific and ethical basis for social-distancing interventions against COVID-19. *Lancet Infect Dis* 2020. doi: 10.1016/S1473-3099(20)30190-0.
3. Deng CX. The global battle against SARS-CoV-2 and COVID-19. *Int J Biol Sci* 2020;16:1676-7. doi: 10.7150/ijbs.45587.
4. WHO. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) [Internet] World Health Organization; 2020 Feb 28 [cited 2020 Apr 05]. Available from: [https://www.who.int/publications-detail/report-of-the-who-china-joint-mission-on-coronavirus-disease-2019-\(covid-19\)](https://www.who.int/publications-detail/report-of-the-who-china-joint-mission-on-coronavirus-disease-2019-(covid-19))
5. Chang SL, Harding N, Zacherson C, Cliff OM, Prokopenko M. Modelling transmission and control of the COVID-19 pandemic in Australia. [Internet] arXiv 2020. [cited 2020 Mar 25] Available from: <https://arxiv.org/abs/2003.10218>
6. COVID-19 Coronavirus Pandemic. [Internet] Worldometer [cited 2020 Apr 02] Available from URL: <https://www.worldometers.info/coronavirus/>
7. WHO. Coronavirus Disease 2019 (COVID-19): Situation Report - 73 [Internet] World Health Organization [updated 2020 Apr 02; cited 2020 Apr 02]. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200402-sitrep-73-covid-19.pdf?sfvrsn=5ae25bc7_6
8. Koo JR, Cook AR, Park M, Sun Y, Sun H, Lim JT, et al. Interventions to mitigate early spread of SARS-CoV-2 in Singapore: a modelling study. *Lancet Infect Dis* 2020;S1473-3099(20)30162-6. doi:

- 10.1016/S1473-3099(20)30162-6.
9. Coronavirus in India: Social distancing can reduce India's cases by up to 62%, says ICMR study [Internet] India Today [cited 2020 Apr 12]. Available from: <https://www.indiatoday.in/science/story/coronavirus-in-india-social-distancing-quarantines-reduce-covid19-cases-icmr-study-1659140-2020-03-24>
 10. Lai S, Ruktanonchai NW, Zhou L, Prosper O, Luo W, Floyd JR, et al. Effect of non-pharmaceutical interventions for containing the COVID-19 outbreak in China. medRxiv. 2020 Jan 1;2020.03.03.20029843. doi: 10.1101/2020.03.03.20029843
 11. Covid-19 Social Distancing Scoreboard - Unacast [Internet] Unacast [cited 2020 Apr 12]. Available from: <https://www.unacast.com/covid19/social-distancing-scoreboard>
 12. Ngo M. Rounding out the Social Distancing Scoreboard - Unacast [Internet]. [cited 2020 Apr 12]. Available from: <https://www.unacast.com/post/rounding-out-the-social-distancing-scoreboard>
 13. Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? Lancet 2020;395:931-4. doi: 10.1016/S0140-6736(20)30567-5.
 14. Ainslie KEC, Walters C, Fu H, Bhatia S, Wang H, Baguelin M, et al. Evidence of initial success for China exiting COVID-19 social distancing policy after achieving containment. Imperial College London (24-03-2020). doi: <https://doi.org/10.25561/77646>
 15. Branswell H. Understanding what works: How the coronavirus is being beaten back [Internet]. STAT. 2020 [cited 2020 Apr 12]. Available from: <https://www.statnews.com/2020/03/20/understanding-what-works-how-some-countries-are-beating-back-the-coronavirus/>
 16. Kilgore T. 5 reasons the spread of the coronavirus in the U.S. could be worse than in Italy [Internet]. MarketWatch. 2020 Apr 04 [cited 2020 Apr 12]. Available from: <https://www.marketwatch.com/story/5-reasons-why-the-us-spread-of-covid-19-could-be-worse-than-italy-2020-03-30>
 17. Barnett-Howell Z, Mobarak A M. Should low-income countries impose the same social distancing guidelines as Europe and North America to halt the spread of COVID-19? [Internet] Yale University, 2020 Apr 02. [cited 2020 Apr 13] Available from: <https://som.yale.edu/sites/default/files/mushifiq-howell-v2.pdf>
 18. PAHO. Non-pharmacological interventions (NPIs): Action to limit the spread of the pandemic in your municipality in Leadership during a pandemic: what your municipality can do. [Internet] Pan American Health Organization [cited 2020 Apr 12]. Available from URL: https://www.paho.org/disasters/index.php?option=com_docman&view=download&category_slug=tools&alias=530-pandinflu-leadershipduring-tool-4&Itemid=1179&lang=en
-