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Modes of Preventing Secondary and Tertiary Community Spread of Future Epidemics COVID-19

Sunil J. Wimalawansa*

Department of Medicine, Endocrinology & Nutrition, Cardio metabolic and Endocrine Institute, N.J., USA

Abstract

A stronger immune system is essential to swiftly overcoming invading pathogens such as viruses, bacteria, and fungi. Infections with any coronaviruses are no exception. In addition to making right administrative decisions that enable promptly to control the disease, educating and facilitating people to have a strong immune system is the most important cause of action to reduce complications and deaths from microbial infections, especially from COVID-19. Measures such as community testing for COVID-19, supervised home quarantining, and effective social distancing, the use of face masks, and adhering to personal hygiene, collectively enable flattening infectious peaks, minimize hospital burdens, and improved clinical outcomes. However, having a strong innate immune system is the most important in preventing viral entry into human cells; enhance neutralization and destruction of the virus, and quicker elimination of COVID-19. Through multiple pathways, vitamin D facilitates all these process. Vitamin D stimulates a verity of immune cells, and enhances the production of neutralizing antibodies and antimicrobial peptides that destroy COVID-19. In addition to vitamin D sufficiency, there are other important aspects in preventing primary and secondary peaks of COVID-19. These include having sufficient intakes of antioxidants, trace minerals such as zinc and selenium, vitamin K2, magnesium, omega-3 fatty acids, resveratrol, quercetin, and curcumin, and safe sun exposure. These, together with adhering to mentioned preventative public health principles, such as keeping social distance, wearing face masks in public, and proper personal hygiene is the best and most cost-effective option in staying healthy during the COVID-19 pandemic.

Keywords: Coronavirus • Infection • Equatorial • Innate Immune System • Vitamin D • PCR Testing • Antibodies • Tropical countries

Introduction

COVID-19 is the third severe coronaviral epidemic during the past two decades, following severe acute respiratory syndrome (SARS) in 2003 and the Middle East respiratory syndrome (MERS) in 2012. Wild animals are the natural hosts of these viruses though which viruses are transmitted to humans. SARS-CoV and MERS-CoV can be transmitted directly to humans from civets and dromedary camels, respectively, both known to originating in bats [1]. However, there are continuing doubts about the origin of SARS-CoV-2 (COVID-19) [2,3] with some evidence (but not proof) that it arose as a result of human intervention. Contrary to false belief, COVID-19 causes a lower respiratory disease, similar to SARS and MERS, but spreads but less lethal [1, 4,5].

Despite previous claims by leading health authorities including the World Health Organization (WHO), COVID-19 is spread primarily through the air, in aerosol form via micro-droplets [6]. This virus can self-transfer in humans via any mucous membrane, as a result of touching by contaminated fingers [4], and to a lesser degree from contaminated and undercooked food, transmitted through the gastrointestinal tract [7].

Administrations of countries that continue to struggle to control local epidemics should consider adapting and implementing the measures taken by countries that have successfully contained virus spread. These countries include South Korea, Taiwan, New Zealand, Germany, Singapore, Iceland, and Denmark, etc. [8-10]. For examples, opening up of community testing centres, drive-through PCR testing, home-based specimen collection options, etc., would allow significantly higher detecting COVID-19 positive asymptomatic persons, facilitating contact tracing and decrease nosocomial transmission and facilitating optimal clinical care [8, 11-13].

Formulae that Successful Countries Followed

At the beginning of the pandemic, the leaders of the above-mentioned countries explained the gravity of COVID-19 to the public, the actions needed to overcome the spread of the virus, and what and how the governments were going to implement such actions. Consequently, the public developed the trust and fully cooperated with the respective governments. This positively influenced the compliance of their citizens, including social distancing [9]. Most importantly, these counties did not impose nationwide lockdowns and curfews. Consequently, the public was affected less, and economy did not collapse compared to those countries mandated months' long curfews.

The hallmark of governments that were successful includes, provision of public testing facilities for COVID-19 (mostly free of charge) , and the communities willingly participated in getting tested, voluntarily wore face masks in public, and complied with social distancing and personal hygiene [4-9]. The result was the mentioned countries rapidly and effectively managed to flatten the peak of COVID-19 infections. Unfortunately, such did not happen in countries, as the United States, India, Australia, and several southern European countries. The key measures that led to successful control of COVID-epidemic include, taking decisive and prompt actions based on standard public health principles (not bowing to political or

***Corresponding Author:** *Sunil J. Wimalawansa, Professor of Medicine, Endocrinology & Nutrition, Cardio metabolic and Endocrine Institute, N.J., USA; Email: suniljw@hotmail.com*

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military pressures), governments being transparent, taking right affirmative action early in the course, and obtaining full cooperation of the public to systematically combat COVID-19 pandemic.

Making Importance of Prompt and Informed Decisions

Prompt actions taken by these governments helped them avoid having their healthcare systems be overwhelmed (see Figure 1 below), which is the fundamental goal of social distancing. It is noteworthy that the leaders of most of the mentioned successful countries are women. It seems that female leaders may have better listening abilities, less ego and desire to control.

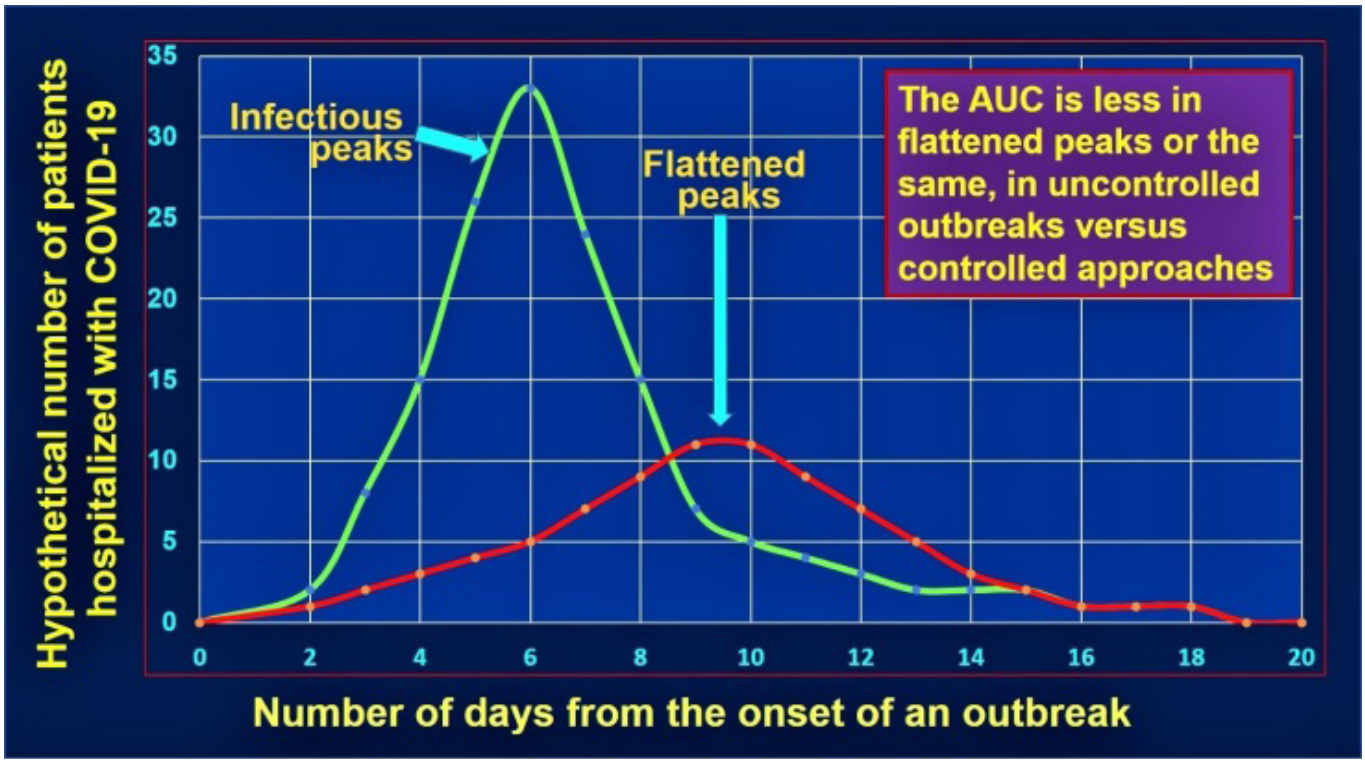

Figure 1. Natural outbreak vs. public health control of an epidemic: Figure illustrates peak of COVID-19 patients' (incidence) and the outcome from an effective social distancing and contact isolation intended to flatten the peak of COVID-19 infection. The goal is to spread the disease over time and reduce the number of people infected in a short period, thus, preventing overwhelming healthcare facilities.

Consequently, they had the ability to improve understanding of the overall situation and obtained advices from relevant experts, leading to taking early, compassionate, and inspirational affirmative actions. Collectively, the ability to take decisive and right actions promptly for the betterment of their country paid off on health, socioeconomic and welfare of their population. Other leaders should follow these successful formulae at least for the current second and third peaks of COVID-19 that is yet to come.

Harsh Restrictions, Community Deaths, and Fictitious Statistics

There is no credible evidence that imposing severe restrictions, such as curfews for months has any tangible effect on preventing the spread of COVID-19 or reducing related deaths. On the contrary, because of excessive crowd gatherings to buy essential items, intermittent release of harsh restrictions, etc., has increased the community spread of the disease. Many tropical countries, such as Sri Lanka and Indonesia while claiming smaller number of COVID-19 infections and deaths (misleadingly low), failed to identify thousands of infected persons, because they did not carry out community-based PCR testing and deaths even in hospitals.

In addition, estimated thousands of COVID-19–related community deaths have occurred in countries that imposed total lockdown and prolonged curfews, as a consequence of harsh restrictions. In the absence of prolonged curfews, most of these community deaths could have been prevented. Therefore, post-curfew deaths should be include in the COVID-19 statistics in these countries. In months to come, there will be COVID-19-related peak of notable psychological disorders, such as severe depression and post-traumatic stress disorder, and suicides [12] that resulted or exacerbated due to lockdown and curfews. Such administrations must be made accountable for these human misery and catastrophic economic collapse.

The inability or unwillingness of many developing countries, especially in tropics, to carry out community PCR and/or antibodies testing using statistically representative communal samples have increased the unpredictable community and hospital clusters, causing undesirable outcomes. Evidence is mounting that some countries have manipulated COVID-19 statistics for political reasons, such as maintain power, favoring elections, as a justification for continuation of curfews or lessening of restrictions, and for selfish personal gains. Being less than honest have misleads not only their citizens but also the world at large.

The Benefits of Community-Based Testing for COVID-19 Antibodies

The current community-based antibody testing programs conducted in a few locations provide an ongoing index of people who were infected and recovered without their awareness (asymptomatic persons) and as a tool to assess herd immunity [14,15]. These community-based antibody data from several countries highlighted that COVID-19 infection significantly

outnumber the reported positive cases in hospitals by a factor between 10 and 40. Therefore, it is reasonable to multiply the COVID-positive number of people in countries that are not engaged in community testing, by an arbitrary (a median) factor of 20 to obtain a reasonable estimated number of people affected.

The vast majority of people who dies (i.e., over 95%), especially the elders, reported to have severe vitamin D deficiency and consequently, had poor innate immune systems [16,17]. Whereas, those who had asymptomatic disease or affected mildly did not have severe vitamin D deficiency [18,19]: they had higher serum 25(OH)D concentrations and therefore, reasonable immune system [16,17, 20]. Consequently, such people did not have symptomatic COVID-19 syndrome, were not subjected to diagnostic PCR testing, and thus, were not included in official COVID-19 statistics. Antibody testing also provides information on identifying volunteer sources for potential use of convalescent plasma from recovered persons for those who are critically ill in hospitals and those who are safe to continue to work outside their homes [21].

Asymptomatic Carriers and Flattening the Curve

Growing clinical evidence suggests that the intestinal tract is an alternative route of infection [7]. People who had contacts with infected wild animals, those affected with virus including asymptomatic carriers, and individuals with gastrointestinal symptoms with COVID-19 have been overlooked, and their contribution to the spread of the infection has been therefore, underestimated. Clinicians should be mindful to identify people with fever with gastrointestinal symptoms, such as unexplained diarrhoea or lose motions associated with aches and pains. These persons also can transmit the viruses to others, so as the infectious, pulmonary COVID-19 [22].

Community-based PCR testing suggests that for each patient diagnosis with COVID-19 based on RT-PCR testing in hospital or quarantine centres, there are as many as up to 20 infected persons in the community. These asymptomatic carriers are an important source of spread of COVID-19. This source has been neglected and underestimated by administrators, in countries that do not carry out community antibody and/or PCR testing. This group of otherwise healthy individuals unknowingly, spread the disease to vulnerable people, such as the neighbours, relatives, teachers and the elderly. In addition to detecting such people, the goal of social distancing and other public health measures are to reduce the incidence of COVID-19 infection, as depicted in Figure 1.

Why Community Testing is Important from a Public Health Point of View

As depicted in the Figure 1, the goals of social distancing are to flatten the peaks of an infection [9], so that the healthcare facilities and staff are not overburdened by caseloads. The principle and fundamental path of actions needed to achieve this remain, PCR testing, contact tracing, and humane isolation/quarantining; these measures should continue.

However, in the absence of community testing, the mentioned actions alone are insufficient for preventing secondary peaks of infection. This is simply because, in the absence of data from community testing, no realistic predictions can be made regarding the occurrence of outbreaks, their severity, and knowledge-based resource allocation. Consequently, the countries that refused to carry out community testing, irrespective of the reason, are markedly underestimating the number of people infected with COVID-19, indirectly overestimating the rate of deaths, and report misleading statistics.

Countries that are conducting less RT-PCR testing and not conducting community-based PCR or antibody testing for COVID-19, face the dilemma of not having the needed information for knowledge-based decision making and allocating resources. These same countries also markedly under-report the numbers of COVID-19–related deaths because they do not testing the sick and dying in hospitals, and in the community. Consequently, the number of deaths reported are unreliable and is a fraction of the COVID-19–related deaths.

Use of RT-PCR Data Alone can be Misleading Regarding the Prevalence of COVID-19

Most people who recover rapidly from COVID-19 and those who are asymptomatic have reasonably innate immune systems. Therefore, they are not subjected to PCR testing and not included in COVID statistics. This is particularly applicable to those tropical counties where there is plenty of summer-like sunshine and thus, having very few with severe vitamin D deficiency [23-25]. As a result, unlike in temperate counties, in excess of 90% of persons in tropical countries who get exposed to sunlight, experience little or no symptoms. This enables them to have a reasonable innate immune system and rapidly recover from COVID-19 and have very few deaths.

In early summer in the northern hemisphere in 2020, the world is still in the middle of the COVID-19 pandemic. Certain cities epicentres, like in New York, New Jersey, Northern Italy, and Spain, etc., a larger percentage of people have contracted COVID-19 and recovered. They have developed antibodies against COVID-19 antigens. While reinfection is still a possibility, the herd immunity occurs, when in excess of 60% in a community developed antibodies against a particular microbe. For example, community-based studies in Santa Clara and Los Angeles revealed that antibody positivity is approximately 10%.

However, in COVID-19 epicentres, such as Gangelt, Germany, and Manhattan, the prevalence of immunity is about 30 to 50%. Thus, in most cities and counties, the percentage who recovered and having protective antibodies against COVID-19 is too small to provide community-based protection from COVID-19, it will continue to increase with time. Therefore, as the United Kingdom opted, based on faulty modelling predictions [26], it was a mistake to rely upon herd immunity to achieve community protection. By the time, herd immunity is reached, the virus is likely be less virulent but mutated, and thus the antibodies may not be protective against new strains of COVID-19.

Quarantine and Draconian Approaches to Crowd Control

Public health principles for basic contagious disease prevention include, voluntary social distancing, contact tracing, and humane quarantining. Preferably self-quarantining, rather than involuntary, forced, group or herd quarantining that is inhumane and unethical. Mentioned above are standard public health procedures implemented for preventing escalating infections, including COVID-19, facilitating to and flatten outbreaks.

Such measures are activated during public health crises, and are intended to prevent overstretching healthcare systems and reducing mortality [27-29]. Whereas, imposing curfews and forced quarantining are less effective, and physically and mentally harm people, and in fact, increasing the spread of community infection and deaths. The current approaches by some countries of locking down cities and states, and 24-hour countrywide curfews are totally misguided and unethical measures and are unnecessary. Such draconian measures cause misery and harm to

people, destroy the economy and the livelihoods of over a two third of the adults, including migrant workers and daily wage earners.

Therefore, it is not surprising that prolong curfew leads to impairments of psychosocial and physical health of a significant proportion of people, and in the long term, the development of severe depression and posttraumatic stress disorders and increased mortality in the community among vulnerable populations. Moreover, unthoughtful, prolonged curfews, directly and indirectly disproportionally harm the elderly, children, and women. The latter include, spousal abuses, rapes, domestic violence, alcohol-related violence, etc.

Additional Approaches to Control Community Spread of COVID-19

Currently, the goal is to prevent individuals from acquiring and spreading the disease by strictly adhering to public health and local guidelines to minimize virus spread and outbreaks. It is also necessary to carry out well-designed, hypothesis-driven, target-oriented randomized controlled clinical trials to answer many clinical questions, including assessing and developing strategies to improve individual and population immunity [30] and developing sand and affordable treatments and vaccines.

Currently, there are over 40 large randomized clinical trials (RCTs) conducted in multiple countries. Virtually all of them are related to treatment. What is more important is the COVID prevention RCTs, especially in quarantine centres, aircraft carriers, prisons, and communities with high density of population, such as slumps.

In parallel, as mentioned above, it is important to measure the presence of antibodies in random samples in community settings to identify those who had and recovered from COVID-19 infection. Identifying this pool of people who have had the infection is essential for strategic planning, proper resource allocation, cost-effective management, and reporting accurate statistics, enabling to make proper and informed proactive decisions.

Conclusion

Reliable data are essential for proper planning and allocation of resources and the provision of proactive measures to minimize risks to people. In this regards, community-based PCR and antibodies testing are useful tools for making informed decisions in the planning and controlling community outbreaks and secondary peaks of COVID-19 infections. Such measures include the provision of micronutrients [13, 31,32], especially large-scale, community-based provision of vitamin D and other micronutrients [23, 33,34]; antioxidants; trace minerals, such as zinc and selenium; essential fatty acids; flavonoids; and other micro- and nano-nutrients [21, 35].

Antibody and RT-PCR data reported by multiple sources suggest the real rate of infections is much higher than reported by the health authorities (i.e., approximately, 20-fold higher). Such testing provides a basis for scientists and epidemiologists to have focused investigations and for administrations to adopt alternative strategic approaches. In addition, it is essential that the majority of people understand and comply with the epidemic containment methods, elimination, and exclusion strategies [36].

The combination of the above facilitates proper functioning of the innate immune system that is necessary to overcome COVID-19; this is boosted by having vitamin D adequacy. In addition, advice regarding daily safe sun exposure should be provided through the mass media to improve the vitamin D status and the immune system of individuals in the entire country. Collectively, these actions would enable individuals to successfully overcome COVID-19 at a markedly less cost without COVID-related complications, deaths, and economic destruction. Those countries failed to adhere to the mentioned strategies during the first 6-months of the COVID-19 pandemic, must consider embracing them to prevent further misery and harm and economic collapse during the second and third waves of COVID pandemic.

Conflict of Interest

The author declares no conflicts of interest.

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