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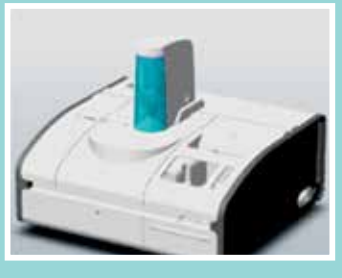

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Why Do Countries' COVID-19 Death Rates Vary So Much?

European countries have the highest infection and death rates, Asian countries remarkably lower ones, and Canada falls in between Asia and the US.

Infected people in the US are 500 times more likely to die compared to Singapore is too serious to ignore.

Death rates as on 8th May: World - 6.9%; Europe - 9.6%; North America - 6%; Asia - 3.4%; South America - 5.1%; Africa - 3.8%; Oceania 1.4% and deaths per million population: USA - 232; Spain - 558; World - 34; India - 2.

On 15th may: Case fatality - USA 6%, Switzerland 6%, Sweden 12.4%, Belgium 16.3%, Spain 11.8%, France 15%, Germany 4.4%, Italy 13.9%, Netherland 12.8%, Canada 6.9%, UK 14.7%, Hong Kong 0.4%, Singapore 0.1%, South Korea 2.4%, Taiwan 1.4%, China 5.6% and Japan 3.8%.

WHAT REALLY EXPLAINS THESE STARK DIFFERENCES?

Multiple factors at play: Testing capacity, case definitions, age distribution and preparedness.

- **The extent of testing:** Since the outbreak in January 2020, testing for coronavirus disease (COVID-19) was widely accessible in Asia; Germany. The European country with the lowest mortality rate, also deployed early testing. Although a lack of testing may result in underestimation of cases and deaths, countries that have better control of the outbreak ensured wide access to testing. It does not appear that widespread testing makes the epidemic look worse by finding more people with minor or no symptoms. Infection rates are low in Asian countries and high in the US and Spain where testing was less available. **However, in India with testing only of symptomatic and high-risk cases the case fatality remains <3.5%.**
- **Countries define and report COVID-19-related deaths differently,** and those methods changed over time. In the early phases of the epidemic in mainland China, the first few versions of case definition required that up to six criteria needed to be met, which probably underestimated cases by fivefold. As of April 14, 2020, the new CDC guidelines include counting both **confirmed and probable cases**, which depended on doctors' judgment based on symptoms and contact history. The attribution of cause of death to COVID-19 probably varies by country, especially since most of these deaths occur in people with chronic illnesses. Some countries are not including deaths due to myocardial infarction, embolism, etc. as COVID deaths. **However, this can make a difference of only 5% as evident by cases on 12th February when china included the clinical CT diagnosed criteria.**
- **Demographics:** In Hong Kong, 60% of cases were incoming travelers, largely consisting of returning students and expatriates. In Singapore, outbreaks in foreign worker dormitories constitute 80% of cases, while community cases only account for 10%. **These younger populations are relatively healthy and may contribute to overall lower mortality rates. In contrast, in European countries such as France**

and Italy, and in the US, community outbreaks in nursing homes and long-term care facilities contribute to higher infection and mortality rates among the elderly. Multiple factors at play: testing capacity, case definitions, age distribution, preparedness it does not explain why in Japan with very high elderly population the morality remains 3.8%.

- **Density of population:** India - In states with average population density of 1,185/sq km, the average number of cases were 2,048. On the contrary in states with population density of 909/sq km, the number of cases were 56. (When Chandigarh and Pondicherry were taken out from this group) the average density of other states were 217 and the average number of cases were 35 (*HCFI*).
- **Bacille Calmette-Guérin (BCG) vaccination:** Countries that do not have a BCG vaccination policy have ten times greater incidence of and mortality from COVID-19, compared with those who do, as per a forthcoming study from medical researchers in the US and UK, which analyzed data from 178 countries. The study looked at COVID-19 instances and mortality for 15 days between 9 and 24 March in 178 countries and concluded that "incidence of COVID-19 was 38.4/million in countries with BCG vaccination compared to 358.4/million in the absence of such a program. The death rate was 4.28/million in countries with BCG programs compared to 40/million in countries without such a program." Out of the 178 countries studied, 21 had no vaccination program, while the status was unclear in 26 countries.
- The report **measles, mumps and rubella (MMR) vaccine appears to confer strong protection from COVID-19: Few deaths from severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) in highly vaccinated populations** describes how children and most adults under 50 are likely protected from COVID-19 because of the rubella component of common MMR vaccinations. Some young children with a rare condition known as Kawasaki disease are, however, getting severe COVID-19 complications, which could relate to a relationship between MMR vaccines and COVID-19.

  A tremendous amount of data points to the conclusion that the rubella component of MMR vaccines is what protects most children from COVID-19. Unfortunately, if a child has a genetic predisposition to Kawasaki disease, they may not be protected from COVID-19 because Kawasaki disease is known to diminish the responsiveness of MMR vaccinations.
- The countries **also differ in the capacity of their healthcare systems to handle a rapidly spreading epidemic.** When surges of patients overwhelm the healthcare system's capacity, mortality rates skyrocket. Countries with best of the ICU care will have lower mortality. **But as on today, there are only 2% of the patients who are serious, and this would only make 0.3% difference in the case fatality rate. And also, the case fatality in Europe and North America with very high level of intensive care has the highest mortality.**
- **Robust preparedness and response strategies:** Death rates were much lower in countries and regions that had standing plans for containing the infection. For example, Singapore, Hong Kong, China and Canada had confronted the severe acute respiratory syndrome (SARS) epidemic in 2003. That very serious threat had led them to develop national strategies to build capacity, preparedness, coordination and communication in preparation for the next outbreak. The painful experience of SARS also resulted in a higher level of public acceptance and adherence to masking and social distancing measures. Amongst CMAAO countries, India has dome worse as it had never faced SARS like illness before.
- Negative isolation **rooms and timely reverse transcription-polymerase chain reaction (RT-PCR) report**: A negative-pressure airborne infection isolation (AII) room is designed to isolate a patient who is suspected of, or has been diagnosed with, an airborne infectious disease. The negative-pressure isolation room therefore is designed to help prevent the spread of a disease from an infected patient to others in the hospital.

  Negative-pressure isolation rooms require a minimum of 12 air changes of exhaust per hour and must maintain a minimum 0.01-inch water column (WC) negative-pressure differential to the adjacent corridor whether or not an anteroom is utilized. Typically, a setpoint closer to minus 0.03-inch WC is used. When not required for use with an infectious patient, the negative-pressure AII room may be occupied by noninfectious patients. The negative-pressure relationship to the corridor should be upheld; however, it is not required to be maintained at the minimum of minus 0.01-inch WC.

All SARS and MERS (Middle East respiratory syndrome) affected countries had enough and mandatory AII rooms in their hospitals. All the patients in the triage room are in kept in the ER AII room. The RT-PCR report is available in 3 hours and then the patient is shifted to a COVID or non-COVID facility accordingly. South Korea this time expanded their AII room numbers in 5 days.

- **Culture:** Japan, India, China, South Korea, etc. most Asian countries have a culture of Namaste or bowing. This might have been the protective factor in human-to-human transmission. The burka, nakab wearing is Islam women may be protective in Arabian countries. Cult communities, the mortality and number of cases would have been half if the cultural practices of South Korean Church and Jamatis in India would have cooperated in the virus spreading management. These communities do not believe in masking, isolation and treatment. Also, culture of not putting elderly in the nursing homes in the Asian countries also helped. In US and Europe, nursing home inhabitants had high mortality rates.
- **The virus behaves in seven different ways and these responses may differ from country to country with variable mortalities.**
  - It's a viral self-limiting disease.
  - It caused immune inflammation (high ESR, CRP and ferritin).
  - It causes bacteria like activity (responds to antibiotics and severe cases have high procalcitonin levels).
  - It causes thrombi inflammation (high D-dimer with high fibrinogen levels).
  - It causes cytokine storm like influenza.
  - It has HIV like activity, attacks CD4 and T cells and causes low lymphocytes counts.
  - Walking dead with severe silent hypoxia without damage to the lungs and retained consciousness levels.

For example, severe inflammatory disease among infants who are arriving in hospital with high fevers and swollen arteries.

Country, Other	Total Cases	New Cases	Total Deaths	New Deaths	Total Recovered	Active Cases	Serious, Critical	Tot Cases/ 1M pop	Deaths/ 1M pop	Total Tests	Tests/ 1M pop	Population
Asia	**7,78,081**	**+20,157**	**24,302**	**+339**	**4,45,644**	**3,08,135**	**4,941**					
India	90,648	+4,864	2,871	+118	34,224	53,553		66	2	2,134,277	1,548	1,378,307,692
China	82,941	+8	4,633		78,219	89	11	58	3			1,439,323,776
Pakistan	38,799	+1,581	834	+31	10,880	27,085	111	176	4	3,59,264	1,631	2,20,333,311
Singapore	27,356	+465	22	+1	8,342	18,992	16	4,681	4	2,24,262	38,371	5,844,637
Bangladesh	20,995	+930	314	+16	4,117	16,564	1	128	2	1,67,114	1,016	1,64,484,082
Indonesia	17,025	+529	1,089	+13	3,911	12,025		62	4	1,82,818	669	2,73,160,748
Japan	16,237	+34	725	+12	10,338	5,174	232	128	6	2,40,368	1,900	1,26,522,222
Philippines	12,305	+214	817	+11	2,561	8,927	79	112	7	2,15,060	1,966	1,09,395,919
South Korea	11,037	+19	262	+2	9,851	924	55	215	5	7,41,145	14,457	51,263,879
Malaysia	6,872	+17	113	+1	5,512	1,247	13	213	3	4,34,136	13,435	32,313,467
Thailand	3,025		56		2,855	114	61	43	0.8	2,86,008	4,099	69,778,764
Hong Kong	1,053		4		1,022	27	1	141	0.5	1,68,291	22,470	7,489,431
Sri Lanka	957	+22	9		520	428	1	45	0.4	42,056	1,965	21,402,294
Taiwan	440		7		389	44		18	0.3	68,988	2,897	23,811,570
Vietnam	318	+4			260	58	2	3		2,75,000	2,828	97,229,451
Nepal	281	+14	1	+1	36	244		10	0.03	92,440	3,180	29,068,924
Myanmar	182	+1	6		96	80		3	0.1	13,634	251	54,364,802
Cambodia	122				122	0		7		14,684	880	16,689,523

Country, Other	Total Cases	New Cases	Total Deaths	New Deaths	Total Re-covered	Active Cases	Serious, Critical	Tot Cases/ 1M pop	Deaths/ 1M pop	Total Tests	Tests/ 1M pop	Population
Oceania	**8,638**	**+17**	**119**		**7,890**	**629**	**16**					
Australia	7,036	+17	98		6,362	576	16	276	4	1,015,652	39,888	25,462,599
New Zealand	1,498		21		1,428	49		311	4	2,23,937	46,485	4,817,371

Country, Other	Total Cases	New Cases	Total Deaths	New Deaths	Total Recovered	Active Cases	Serious, Critical	Tot Cases/ 1M pop	Deaths/ 1M pop	Total Tests	Tests/ 1M pop	Population
Europe	**1,761,355**	**+20,226**	**1,61,672**	**+1,190**	**7,55,525**	**8,44,158**	**11,757**					
Spain	2,76,505	+2,138	27,563	+104	1,92,253	56,689	1,208	5,914	590	3,037,840	64,977	46,752,605
Russia	2,72,043	+9,200	2,537	+119	63,166	2,06,340	2,300	1,864	17	6,656,340	45,614	145,926,952
UK	2,40,161	+3,450	34,466	+468	N/A	N/A	1,559	3,540	508	2,489,563	36,696	67,842,296
Italy	2,24,760	+875	31,763	+153	1,22,810	70,187	775	3,717	525	2,944,859	48,698	60,472,408
France	1,79,365		27,625	+96	61,066	90,674	2,132	2,749	423	1,384,633	21,218	65,256,039
Germany	1,76,247	+548	8,027	+26	1,52,600	15,620	1,203	2,104	96	3,147,771	37,585	83,751,395
Belgium	54,989	+345	9,005	+46	14,460	31,524	364	4,747	777	6,63,755	57,302	11,583,464
Netherlands	43,870	+189	5,670	+27	N/A	N/A	346	2,561	331	2,87,943	16,809	17,130,286
Switzerland	30,572	+58	1,879	+1	27,400	1,293	69	3,536	217	3,39,364	39,247	8,646,793
Sweden	29,677	+470	3,674	+28	4,971	21,032	278	2,941	364	1,77,500	17,589	10,091,512
Portugal	28,810	+227	1,203	+13	3,822	23,785	115	2,824	118	6,00,061	58,828	10,200,225

Country, Other	Total Cases	New Cases	Total Deaths	New Deaths	Total Recovered	Active Cases	Serious, Critical	Tot Cases/ 1M pop	Deaths/ 1M pop	Total Tests	Tests/ 1M pop	Population
North America	**1,660,308**	**+28,140**	**1,01,662**	**+1,641**	**4,21,214**	**1,137,432**	**17,398**					
USA	1,507,773	+23,488	90,113	+1,218	3,39,232	1,078,428	16,248	4,558	272	11,949,625	36,127	330,764,077
Canada	75,864	+1,251	5,679	+117	37,819	32,366	502	2,012	151	1,265,502	33,567	37,700,962

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Ayurvedic Approach to Coronavirus Disease 2019

ANITA MAHAPATRA*, CD SIBY†

ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2). It is primarily spread between people via respiratory droplets from cough and sneeze, contact with infected individuals and fomites. There is no specific treatment available for coronavirus till now and a vaccine may be available only by 2021. This viral disease could be successfully prevented with Ayurvedic medicines, special diet and regimen. There have been many earlier instances of infectious outbreaks effectively managed over centuries with Ayurvedic principles. **Objectives:** To support the national health care system in preventing spread of coronavirus, address the psychological trauma in society and find an effective preventive medication for COVID-19. **Methodology:** A systematic literary review and research of available documents related to similar infectious diseases were studied. An open debate was also conducted among Ayurvedic experts to develop an Ayurvedic treatment protocol for infectious diseases based on Ayurvedic concepts. **Results and Conclusion:** COVID-19 could be considered as *kapha-vata samsargaja jwara*, with association of *pitta*, in initial phase of disease. But if the patient is of geriatric age and has comorbidities, low strength and compromised immunity, the health condition worsens; symptoms progress, vitiated *pitta* develops into a condition of *dhatupaka* and *ojakshaya* and eventually leads to *sannipata jwara*. In respect to this condition, a unique combination of five Ayurvedic medications could be given as preventive medication along with other social hygiene measures. The formulation is a combination of two herbal decoctions (*Panchatikta Kashayam, Dasamoolakaduthrayam Kashayam*) and three tablets (*Swasanandam Gulika, Vilwadi Gulika, Vettumaran Gulika*) to cater in this emergency need, even though Ayurveda advocates a customized treatment protocol based on individual constituents and other factors. It is remarkable to find that the classical texts described centuries back regarding epidemic disease are very much relevant in this present era, and their importance cannot be neglected.

Keywords: COVID-19, Ayurveda, Tridosha, Kashaya, Rasayana

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by a new recently discovered novel coronavirus. The disease was first identified in 2019 in Wuhan, the capital of Hubei province in Central China and has since spread globally, resulting in the 2019-20 coronavirus pandemic.[1,2] More than 200 countries are in the grip of this deadly viral disease for which there is no specific treatment available till now and a vaccine may be available only by 2021. As per World Health Organization (WHO) factsheet, as on 15th April, there are 2,005,542 confirmed coronavirus cases; of these, 95% of cases are mild and 5% cases are critical.

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When a person suffering from this disease sneezes or coughs, a lot of droplets spread in the air or fall on the ground and nearby surfaces. If another person is nearby and inhales the droplets or touches these surfaces and then touches his face, eyes or mouth, he can get the infection. The chances are more if one is within a distance of less than 1 meter from the infected person. Majority of the people (80%) require only symptomatic treatment and will recover on their own. A small proportion (<20%) may need hospitalization. A very small proportion (mainly with underlying chronic illness) may need admission in intensive care unit (ICU).[3]

This disease is known to occur in all age groups. In children, the infection is mild. Older persons and persons with pre-existing medical conditions (such as high blood pressure, heart disease, lung disease, cancer or diabetes) are at a high risk of developing serious illness.

Common symptoms include fever, cough and shortness of breath. Muscle pain, sputum production,

diarrhea and sore throat are less common.[4-6] While the majority of cases have mild symptoms,[7] some progress to severe pneumonia and multi-organ failure. This is more common in people with cardiopulmonary disease, people with weakened immune systems and older adults. The clinical features of COVID-19 are varied, ranging from asymptomatic state to acute respiratory distress syndrome and multi-organ dysfunction.[8] The test can be done on respiratory samples obtained by various methods, including a nasopharyngeal swab or sputum sample.[9] Results are generally available within a few hours to 2 days.[10]

COVID-19 was declared as a pandemic by WHO on March 11, 2020, as it has confirmed its presence in all continents except Antarctica. Ayurveda classics have coined a term *Janapadodhwansa*, which primarily describes the cause of epidemic disease. The causes of epidemics are *kritya* (harmful acts of people), *abhishapa* (curse of pious being), *rakshakrodha* (invisible beings or microbes), *adharma* (actions for disharmonizing the environment or different position of planet), *visa pusphagandha* (spread of toxic pollen or grasses).[11] Although individuals differ in physical constitution, food habits, suitability, strength, immunity, age, etc., they do get affected with disease owing to vitiation of some factors that are common to all those who inhabit in that community. The factors that are common to all the individuals in a community include air, water, land and season.[12] Agent, host and environmental factors interrelate in a variety of complex ways to produce disease in humans. Their balance and interactions are different for different diseases.[11] These factors lead to the simultaneous manifestation of disease having the same set of symptoms among all the inhabitants leading to widespread manifestation in the community.

Acharya Sushruta, one of the proponents of Ayurveda, has depicted different modes of communicable disease transmission in his classical treatise *Sushruta Samhita*. According to him, infectious diseases spread from person to person by *Gatrasansparsat* (physical contact), *Nihsvasat* (exhaled air), *Sahabhojanat* (eating with others in same plate), *Sahasayasanacapi* (sharing a bed) and *Vastamalyanulepanat* (using clothes, garlands and paste). These concepts are very relevant today like direct contact of fomites, droplet spread, indirect contact like airborne, vehicle borne and vector borne, etc.[13] In addition, he has also given examples of some diseases that spread though all these modes, such as different types of *Kustha* (skin diseases), *Jwara* (pyrexia), *Swasa* (asthma), *Kasa* (epidemic cough), *Pratishyaya* (catarrh), *Sosa* (pulmonary tuberculosis) and *Netrabhisyanda* (conjunctivitis), etc., which are caused by direct contact and respiratory routes, respectively.[11] The mode of transmission happens when a person is involved in *Pranjaparadha* (volitional transgression). *Dhi vibhramsa* (deranged intellect), *Dhriti vibhramsa* (deranged restrain) and *Smritibhramsa* (deranged memory) lead to all sorts of *Ashubha karma* (unwholesome actions). Various failings appear in consequence; ill health and sorrow ensue. The zoonotic transfer of COVID-19 is an example of *Pranjaparadha*; *Adharma* (unwholesome actions); leading to the present pandemic. It could be classified under *Agantuja vikara* (disease from external factor) due to *Bhutabhishangaja* (microbial etiology).[14]

OBJECTIVES

The study is aimed to review the classical texts regarding epidemic diseases and find preventive measures to support national health care system in preventing spread of coronavirus, to educate people on preventing coronavirus, to address mild and moderate stages of coronavirus and address the psychological trauma in society.

METHODOLOGY

The literary review and research of available documents related to similar infectious diseases are studied to find effective intervention for COVID-19. An initial systematic literature review by the help of internet-based search engines revealed very negligible work since it is a new virus. Hence, an attempt was made to analyze various principles of Ayurveda relevant to epidemiology and interpret their contemporary significance. An open discussion was also conducted among Ayurvedic experts to develop a treatment protocol for infectious diseases based on Ayurvedic concepts. A key part of managing the COVID-19 pandemic is trying to decrease the epidemic peak, known as flattening the epidemic curve, through various measures seeking to reduce the rate of new infections.

RESULTS AND CONCLUSION

Ayurveda has a unique method to approach newly detected diseases, always address the whole system that includes *samuthana* (etiological features), *adhishtanam* (site of the pathological process) and *vikaraprakriti* (natural history of the disease).[15] As per a report from the Chinese Center for Disease Control and Prevention, the clinical manifestations of the disease based on their severity are: mild disease (81% of cases;

non-pneumonia and mild pneumonia), severe disease (14% of cases; dyspnea, respiratory frequency ≥30/min, blood oxygen saturation [SpO_2] ≤93%, lung infiltrates >50% within 24 to 48 hours) and critical disease (5% of cases; respiratory failure, septic shock and/or multiple organ failure). The symptoms of mild-to-moderate cases are those of an upper respiratory tract viral infection, including mild fever, cough, sore throat, nasal congestion, headache, malaise. The symptoms of severe cases are fever associated with severe dyspnea, respiratory distress, hypoxia, acute respiratory distress syndrome and malfunctioning of various organs and death. Diarrhea and nausea are very minimal during the initial presentation. Hence, the treatment protocol can be preventive, curative for mild-to-moderate cases, while severe illness needs integrative approach.

Considering the above symptoms of COVID-19, it can be considered as a *kapha-vata samsargaja jwara* (fever arising from simultaneous increase of *kapha* and *vata dosha*) along with *pitta* association, in the initial phase of disease.[16,17] The immediate infected conditions can be considered as vitiated *pitta* and within few days of progression, the symptoms develop into *vata-kapha jwara*. But when the patient is of geriatric age and has comorbidities, low strength and compromised immunity, the health conditions worsen; symptoms progress with vitiated *pitta* and develop a condition of *dhatupaka* (*doshas* undergoing ripening) and *ojakshaya* (diminished vitality) and lead to *sannipata jwara* (fever arising from all the *doshas*).[18] The *adhishtana* (disease site) can be *koshta* (internal organs), but manifestations are seen in *uras* (chest), *pranavaha srota* (respiratory system), which are vitiated and behave like *rogamarga* (passage where disease spreads) and manifestation starts. This is a predominant site of *kapha*. The *pitta* has the property of *ushna*, *sasneha, drava* and *visyandanaguna* in *koshta* exerts a significant pathological influence on *kapha*, thereby making it *asthira* (unstable), *abadha* (unbounded) leading to *dhatupaka* and death.

Understanding the pathophysiology, a combination of five Ayurvedic medications could be given as preventive medication along with other social hygiene measures. This combination has the therapeutic benefits of controlling *kapha-vata sannipata jwara* condition, i.e., to control *jwara*, pacify the vitiated *kapha*, *vataanulomanam*, reduce *dhatupaka* and protect *rogi-balam*. This a combination of 10 mL each of two herbal decoctions (*Panchatikta Kashayam*, *Dasamoolakaduthrayam Kashayam*) and 3 tablets of *Swasanandam Gulika*, *Vilwadi Gulika*, *Vettumaran Gulika*. This combination can be given twice in a day before food for a period of 4 weeks. The synergetic result of this combination is *tikta katu rasa, laghu* and *tikshna guna* (light and penetrating properties), *ushna virya* (hot potency) and *vata kaphagna* (decrease *vata* and *kapha doshas*). The *gunas* of the drug are *laghu*, *tikshna* which are antagonistic to the *gunas* of *kapha dosha*, thereby normalizing *kapha dosha*. The *virya* (potency) of this drug is *ushna* (hot), whereas that of *vata* is *sheetaguna* (cold in character).

Panchatikta Kashayam is a combination of 5 herbs *Kshudra* (*Solanum xanthocarpum*), *Amruta* (*Tinospora cordifolia*), *Nagara* (*Zingiber officinale*), *Paushkara* (*Inula racemosa*), *Kiratatikta* (*Swertia chirata*). It is used for the treatment of intermittent or chronic fevers, 3rd and 4th day fevers and fever caused by all *doshas*.[19] This medicine is used as a preventive measure during outbreak of endemic diseases. The constituent herbs have antiviral and antibacterial properties. *Dasamoolakaduthrayam Kashayam* contains 14 herbs of *Bilva* (*Aegle marmelos*), *Agnimantha* (*Premna integrifolia*), *Shyonaka* (*Oroxylum indicum*), *Patala* (*Stereospermum suaveolens*), *Kasmari* (*Gmelina arborea*), *Brihati* (*Solanum indicum*), *Kantakari* (*Solanum xanthocarpum*), *Shalaparni* (*Desmodium gangeticum*), *Prishnaparni* (*Uraria picta*), *Gokshura* (*Tribulus terrestris*), *Shunthi* (*Z. officinale*), *Pippali* (*Piper nigrum*), *Maricha* (*Piper longum)* and *Vasa (Adhatoda vasica)*.[20] It is used for reducing cough and dyspnea occurring due to lung diseases or respiratory disorders. It is likely to have a hot potency and reduces mucus production in the lungs (pacifies mucus in lungs). The ingredients have anti-inflammatory properties and act as bronchodilator and mitigate inflammation in the airways and lungs. It also acts as an antitussive, appetizer, analgesic and antipyretic. It is used in productive phlegm, in chest pain occurring due to excess gas in alimentary tract and backache. Vettumaran Gutika contains Borax (*Tankan Bhasma*), *Maricha* (*P. nigrum*), *Shuddha Vatsanabha* (purified *Aconitum ferox*), *Shuddha Hingula* (purified and processed Cinnabar), *Ajamoda* (*Trachyspermum roxburghianum*) and *Ginger* (*Z. officinale*).[21] It is used for fever, vomiting and abdominal colic pain. Swasanandam Gulika is a herbo-mineral combination that contains *Shuddha Hingula* (purified and processed Cinnabar), *Karpoora* (*Cinnamomum camphora*), *Vatsanabha* (purified and processed *A. ferox*), *Triphala* (*Terminalia chebula, Terminalia bellirica* and *Emblica officinalis*), used in the treatment of cough, cold, bronchitis and asthma.[22] Vilwadi Gulika contains *Bilva* (*A. marmelos*), *Surasa* (*Ocimum sanctum*), *Karanja* (*Pongamia pinnata*), *Nata* (*Valeriana wallichii*), *Surahva* (*Cedrus deodara*), *Haritaki* (*T. chebula*), *Vibhitaki* (*T. bellirica*), *Amalaki* (*E. officinalis*), *Shunthi* (*Z. officinale*), *Maricha* (*P. nigrum*), *Pippali* (*P. longum*), *Nisha* (*Curcuma*

longa), *Daruharidra* (*Berberis aristata*) and goat's urine.[23] It is used in alimentary canal disorders like sprue and cholera, Crohn's disease, irritable bowel syndrome (IBS) and is antitoxic and antipoisonous. This medicine is used for treating poisonous bites, Herpes zoster, warts, eczema and skin infections such as boils and abscesses. It is very effective in prophylaxis of fever and diarrhea.

This combination was given to 300 patients from OPD of Ayur Centre, Malaysia along with preventive measures for prevention of coronavirus in diverse age groups, ranging from 4 to 80 years, in different dosage forms during the outbreak of coronavirus from 1st February 2020 to 31st March 2020. This combination was found to be safe without any adverse effects. This combination was able to address the symptoms of viral infections, like fever, respiratory complaints like cough, dyspnea and alimentary disorders like diarrhea and reduce endotoxins.

The classical text also recommends prophylactic measures to be adhered during epidemics. The importance is given to isolate yourself from such place, self-control, meditation, follow your masters, obeisance with clasped palms to the Gods, involve in charity, kindness and auspicious rituals and bring transformation in words, thought and deed, etc.[24]

These are few preventive measures, which can be followed during epidemic situations. Like social distancing, avoid touching your eyes, nose and mouth, stay home when you are sick, clean and disinfect frequently touched objects and surfaces using a regular household cleaning spray or wipe, wash your hands often with soap and water for at least 20 seconds, especially after going to the bathroom, before eating and after blowing your nose, coughing or sneezing.

Avoid consuming food from outside, wash fruits in warm water and salt before consuming them, avoid uncooked salads, do not mix meat and dairy in your food, minimize consumption of non-vegetarian food, avoid repeated defrosting and consumption of old food.

Regular exercise, such as 'Alternate Nostril Breathing' can improve lung capacity. It is a relaxing breathing technique that balances the breath and is used to help calm the nervous system and aid in a restful night's sleep. The practice of *yogasana* can be followed under supervision.

Maintain environmental hygiene by de-cluttering your surroundings, fumigate home and surroundings with gum resin, eagle wood bark, carom seeds, turmeric, etc., cleanse your surrounding with *Homa-Havan* with herbs like *Shirisha* (*Albizia lebbeck*), *Nimba* (*Azadirachta indica*), *Palasha* (*Butea monosperma*), *karpoora* (*C. camphora*), *Vacha* (*Acorus calamus*), *Vata* (*Ficus religiosa*), *Shweta nirgundi* (*Vitex negundo*), *Guggulu* (*Commiphora wightii*), etc.

Regularly use herbal decoctions of *Tulsi* (*O. sanctum*), *Ginger* (*Z. officinale*), *Cumin* (*Cuminum cyminum*), *Haridra* (*C. longa*), *Guduchi* (*T. cordifolia*), to strengthen the immune system and prevent unnecessary infections.

Herbal decoctions can be prepared by using six herbs *Musta* (*Cyperus rotundus*), *Parapataka* (*Hedyotis corymbosa*), *Ushira* (*Vetiveria zizanioides*), *Chandana* (*Santalum album*), *Shunthi* (*Z. officinale*) boiled with 64 parts of water, reduce half and filter. *Samshamani vati* 500 mg can be taken twice a day along with *Anutaila* 2 drops on each nostril daily in the morning for 15 days.

The smoke inhalation of *Haridradi varti* can be prepared with *Haridra* (*C. longa*), *Patra* (*Abies webbiana*), etc. smeared in a cloth along with ghee or *Gulguluthikthakam ghrita*, inhaled through nostrils and mouth for curing various ailments of the respiratory tract. It is a very effective treatment for *Urdhwajatrugata vikara* (diseases above the neck), cough and in induction of emesis.

Regular cleansing therapies like therapeutic emesis and purgation can be followed at frequent intervals along with immune booster drugs.

A good number of principles are found in the classical texts of Ayurveda, which can be compared with the concepts of epidemiology. In the process of theoretical analysis, the following concepts were found relevant, such as the concept of causation of disease, causes of epidemic and modes of communicable disease transmission.

It is interesting to note that the classical texts described centuries back are very much relevant in this present era, and can efficiently manage such contagious diseases. Even now their importance cannot be neglected.

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Cases of Large-vessel Stroke in Young Patients with COVID-19

A study published in *The New England Journal of Medicine* has revealed that large-vessel stroke may be another complication of COVID-19. Over a 2-week period from March 23 through April 7, 2020, 5 patients younger than 50 years of age presented with new-onset symptoms of large-vessel ischemic stroke, wrote Thomas J Oxley, MD, Mount Sinai Health System, New York. All the patients tested positive for COVID-19. The author mentioned that every 2 weeks over the previous 12 months, their service has treated, on average, 0.73 patients younger than 50 years of age with large-vessel stroke. All patients presented with signs and symptoms of stroke, including reduced level of consciousness, hemiplegia, and dysarthria. Patients 1, 4 and 5 had COVID-19 symptoms, including cough, fever and lethargy. Two patients delayed calling an ambulance owing to concerns about going to a hospital during the pandemic. (*NEJM*)

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Profile of HIV Infection in Children and Its Correlation with their CD4 Counts

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ABSTRACT

Objectives: (i) To study the clinical profile of human immunodeficiency virus (HIV) infection in children. (ii) To establish the pattern of correlation of these clinical features with the CD4 counts. (iii) To evaluate the effect of highly active antiretroviral therapy (HAART) on CD4 count of children at 6 months of therapy. **Material and methods:** Sixty-eight children enrolled at our ART centre or admitted at our hospital were enrolled for the study. Their case papers were reviewed. Complete clinical profile was obtained and baseline investigations including CD4 counts done. Children were then followed up and repeat CD4 levels done 6 monthly. The children were managed as per current guidelines. **Results:** The mean age at presentation was 6.54 ± 2.69 years. Male-to-female ratio was 2.579:1. Vertical transmission accounted for 95.58% of cases. Prolonged fever and chronic diarrhea were the most common symptoms and hepatosplenomegaly and lymphadenopathy were the most common signs. There was strong correlation between clinical and immunological staging ($p < 0.0001$). Failure to thrive, recurrent skin infections and abscesses were signs and symptoms at lowest CD4 levels. Orphan-hood ($p < 0.0001$) and socioeconomic status ($p = 0.0003$) significantly affected schooling among these children. Malnutrition, anemia and stunting were features of severe immunosuppression. HAART significantly raised the CD4 count at 6 months of therapy (paired 't' = 6.830, $p < 0.0001$) with best results at higher baseline CD4 levels. Gastritis was the most common (81.5%) adverse effect and the major cause of decreased compliance. Tuberculosis and candidiasis were the commonest opportunistic infections and pneumonia accounted for majority of hospitalizations (61.5%). **Conclusions:** Clinical and immunological staging have good correlation. The features of severe immunosuppression are failure to thrive, recurrent bacterial skin infections, abscesses, *Pneumocystis jirovecii* pneumonia, extrapulmonary tuberculosis, anemia and stunting. Orphan-hood and poor socioeconomic status affect schooling in these children. Early initiation of ART at higher baseline CD4 has best results. Gastritis is the major adverse effect causing decreased compliance.

Keywords: CD4 count, children, clinical features, HIV, immunological stage, malnutrition, schooling

The human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) epidemic is in its 4th decade. With the advent of highly active antiretroviral therapy (HAART), most of the countries have halted and begun to reverse the spread of HIV.[1] Although the number of new infections has been falling, levels of new infections overall are still high and with significant reductions in mortality, the number of people living with HIV worldwide has increased. CD count has been the most widely used parameter for monitoring patients. Whereas, the clinical presentation and the opportunistic infections at different CD4 levels have been well-established in adults, data regarding the same in children are lacking. Further, certain other nutritional, social and economical factors like malnutrition, immunization, anemia, parental death and schooling, etc. further complicate the issue in children. The advent of HAART has brought about a major change in the AIDS epidemic pattern. But, the efficacy of HAART and the factors affecting compliance to drugs in children, particularly in Indian setting, has not been well-documented.

The decision to initiate ART is based on the CD4 count of the child. If the facilities for CD4 count are not available, then clinical staging is used for deciding the timing for initiation of ART.[2] However, the best timing for initiation of HAART is still a subject of much debate.

In this study, we aim to establish the pattern of signs and symptoms, prevalence of anemia, malnutrition, vitamin A deficiency and the various opportunistic infections at various levels of CD4 counts in children.

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We will evaluate the effect of HAART in children, the adverse effects associated with these drugs in children and the factors affecting compliance to these drugs. We will also evaluate the factors which are associated with better improvements in CD4 counts in patients on HAART and try to establish their roles in determining the best timing for initiation of ART.

MATERIAL AND METHODS

The study was conducted at the Dept. of Pediatrics, SN Medical College, Agra and ART Centre, SN Medical College, Agra in collaboration with National JALMA Institute for Leprosy and Other Mycobacterial Diseases, (Indian Council of Medical Research), Agra. A sample size of 68 was obtained assuming noncentrality parameter delta = 2.53, type 1 error = 0.05, power (1-β) = 0.90, effect size (d) = 0.40 and a t (critical), one-tailed test = 1.68. Children less than 15 years of age were enrolled in the study as per the classification by UNAIDS.[1] Known HIV-positive children attending the ART Centre, SN Medical College and those children who were diagnosed as HIV-positive during the course of their management in the hospital were included in the study. Institutional Thesis and Ethical Committee cleared the study. The study protocol was explained to the parent/guardian in detail and informed, written consent was obtained from them. Data was obtained from the parents/guardians as per the predesigned questionnaire and by referring to their records for investigations. A detailed history covering all aspects was taken. Complete physical examination including anthropometry was done. Investigations were accessed from the records of the patient. If not available, investigations were carried out at SN Medical College. CD4 count of the child was done using the Becton Dickinson's automated fluorescence-activated cell sorter (FACS), at National JALMA Institute for Leprosy and other Mycobacterial Diseases. Protein energy malnutrition (PEM) was graded on the basis of weight for age (independent activities period [IAP] grading). Anemia was taken as hemoglobin <8 g/dL according to National AIDS Control Organization (NACO) guidelines.[2] Opportunistic infections were diagnosed based on the standard protocol and investigations available. Each patient was assigned a clinical and an immunological stage as per World Health Organization (WHO) criteria. Children were followed up at monthly intervals and investigations including CD4 counts repeated at 6-monthly intervals. ART naïve children who were eligible for initiation of ART as per the current guidelines were initiated on appropriate treatment as per NACO guidelines.[2] Pearson's correlation coefficient (r) was used to analyze the degree of correlation of clinical and immunological stages. Independent sample *t*-test was used to compare the means of 2 distinct qualitative groups like males and females. Categorical variables were compared by using Chi-square test. Cochran-Armitage Chi-square test for trend was preferred, when one of the variables followed ordinal distribution. To compare the pre- and post-treatment CD4 values, we have used paired *t*-test. To perform all these functions, MedCalc version 11.6 and SPSS version 16 statistical packages were utilized.

RESULTS

The mean age at the time of diagnosis was 6.735 ± 2.75 years for males and 6.05 ± 2.53 years for females, with no significant difference between the groups ($p > 0.05$). Whereas, 72.06% of children in our study were males, only 27.94% were females. Vertical transmission was the predominant mode of transmission of HIV in our study accounting for 95.58% of cases. The remaining 3 (4.41%) had acquired HIV through transmission of infected blood/blood products.

Prolonged fever was the predominant symptom in HIV-positive children (42.64%). Chronic diarrhea (41.17%), prolonged cough (25%), not gaining weight (17.61%), recurrent skin infection (17.61%) and ear discharge (17.61%) were some of the other common symptoms that were present in these children. On examination of these children, the most commonly noted signs were hepatosplenomegaly and lymphadenopathy, both being present in 47.06% children. Oral candidiasis and signs of vitamin A deficiency were both present in 27.94% of children. Other signs noted included pyoderma (26.42%), pneumonitis (26.42%), otitis media (17.68%), dental caries (17.68%), aphthous ulcers (8.82%) and scabies (5.888%). On classifying these children into clinical stages based on WHO clinical staging criteria, majority (35.3%) of children in our study, belonged to clinical stage 3 and 21 (30.88%) children belonged to clinical stage 2; 16.17% and 17.65% children were in clinical stage 1 and 4, respectively. There was no significant variation in clinical staging in different age groups ($p = 0.491$). At the time of enrollment in our study, 23 (33.82%) children were not having any immunosuppression; 13.23%, 22.06% and 30.88% children were having mild, advanced and severe immunosuppression, respectively. Immunological stage was neither dependent on the age of the child ($p > 0.05$), nor was it dependent on the mode of acquisition of HIV ($p = 0.46$). There was a strong association between the clinical and the immunological staging of HIV in

children, i.e., with worsening CD4 status, clinical stage of the child's infection advanced (r = 0.6708 and p < 0.0001) (Table 1). While prolonged fever and chronic diarrhea were the commonest presenting symptoms in children from across all immunological stages, 2 symptoms which were more common in children with severe immunosuppression and less common in others were 'failure to thrive' and 'recurrent skin infections' in 38.09% and 28.57% of children with severe immunosuppression. Hepatosplenomegaly and lymphadenopathy were the commonest clinical signs irrespective of the CD4 status of the children. Pyoderma and abscesses were signs, which were predominantly seen only when CD4 count of the children were very low. Pyoderma was seen in as many as 52.38% of children whose CD4 levels were consistent with stage of severe immunosuppression, whereas, at stages of no immunosuppression and mild immunosuppression, it was seen in less than 10% of the cases (Table 2).

Table 1. Common Clinical Features at Different Grades of Immunosuppression

WHO immunological stage	Common symptoms		Common clinical signs	
	Symptoms	Number of children	Clinical signs	Number of children
No immunosuppression (n = 23)	Prolonged fever	08 (34.78%)	No abnormality	06 (26.08%)
	Chronic diarrhea	04 (17.39%)	Lymphadenopathy	06 (26.08%)
	Ear discharge	04 (17.39%)	Hepatosplenomegaly	05 (21.74%)
	Asymptomatic	03 (13.04%)	Otitis media	05 (21.74%)
Mild immunosuppression (n = 9)	Chronic diarrhea	06 (66.67%)	Lymphadenopathy	05 (55.55%)
	Prolonged fever	03 (33.33%)	Hepatosplenomegaly	04 (44.44%)
	Recurrent oral ulceration	03 (33.33%)	Oral candidiasis	04 (44.44%)
	Asymptomatic	02 (22.22%)	No abnormality	03 (33.33%)
Advanced immunosuppression (n = 15)	Prolonged fever	08 (53.33%)	Signs of vitamin A deficiency	07 (46.67%)
	Recurrent chest infection	05 (33.33%)	Hepatosplenomegaly	06 (40%)
	Chronic diarrhea	05 (33.33%)	Lymphadenopathy	06 (40%)
	Ear discharge	06 (40%)	Pneumonitis	06 (40%)
Severe immunosuppression (n = 21)	Chronic diarrhea	13 (61.9%)	Hepatosplenomegaly	14 (66.67%)
	Failure to thrive	08 (38.09%)	Lymphadenopathy	13 (61.9%)
	Prolonged fever	10 (47.61%)	Oral candidiasis	11 (52.38%)
	Recurrent skin infection	06 (28.57%)	Pyoderma/Abscesses	11 (52.38%)

Table 2. Correlation of the WHO Clinical Stage and WHO Immunological Stage of the HIV-positive Children

	WHO clinical stage 1 (n = 11)	WHO clinical stage 2 (n = 21)	WHO clinical stage 3 (n = 24)	WHO clinical stage 4 (n = 12)
Stage of no immunosuppression (n = 23)	10	09	03	01
Stage of mild immunosuppression (n = 9)	01	04	04	NIL
Stage of advanced immunosuppression (n = 15)	NIL	07	06	02
Stage of severe immunosuppression (n = 21)	NIL	01	11	09

Pearson's correlation coefficient 'r' = 0.6708, 95% CI for 'r' = 0.515 to 0.784, $p < 0.0001$. Concordance correlation coefficient = 0.6488, C_b(accuracy) = 0.9672 (Very strong association).

Sixty-three out of 65 children (96.92%) acquiring HIV infection through mother-to-child transmission were delivered vaginally and only 2 (3%) were delivered by cesarean section. A total of 89.2% children had received breastfeeding in infancy (43.07% - exclusive breastfeeding, 46.15% - mixed feeding).

A majority (52.94%) of families of children in our study belonged to socioeconomic Class IV (Kuppuswamy socioeconomic scale). There was no significant variation in clinical stages among children of different socioeconomic classes ($p = 0.274$). Sixteen percent of children in our study were orphans, i.e., had no alive parent. They were being taken care of by grand-parents, siblings (elder) or uncle/aunt. No child was staying at orphanage. Nearly 42.6% of children had both their parents alive. Eight (11.76%) had lost their mothers and 20 (29.41%) had lost their fathers, thus implying that 57.3% children had lost one or both of their parents. Sixty out of 68 children in our study were of school-going age. Whereas, 84% of children whose both parents were alive were enrolled at school, only 9% of children who had no alive parent were enrolled at school, while 62.5% and 26.6% of children who were survived only by their fathers and mothers, respectively were enrolled at school. All children whose families belonged to socioeconomic Class I or II were enrolled at school; 83.33% of those belonging to socioeconomic Class III had school enrollment. But when it came to socioeconomic Class IV and V, only 38.7% and 25% were enrolled at school, respectively (Table 3). Only 47.06% of children had completed immunization for their age as per the National Immunization Schedule.

Only 17.64% of children in the study had no malnutrition (weight for age more than 80% of expected). Out of the remaining, 30.8%, 19.1%, 23.5% and 8.8% children suffered from Grade I, II, III and IV PEM, respectively. As evident from Table 4, proportion of children with higher grades of malnutrition increased significantly in children with increasing clinical stages of infection ($p = 0.0013$). A similar association was found between the immunological stage and the severity of malnutrition ($p = 0.0038$). However, such positive association was not found between the socioeconomic status and the severity of malnutrition ($p = 0.3123$). Table 5 shows that stunting was present in 25% of the children; 70.59% of children who had stunting were having CD4 counts consistent with the stage of severe immunosuppression ($p = 0.0004$). The prevalence of anemia was 30.9% in our study with the largest proportion of these anemics having CD4 counts consistent with stage of severe immunosuppression (66.67%). Signs of vitamin A deficiency were present

Table 3. Variables Affecting the Child's Schooling

Variables	Children enrolled at school (Number of children [%])	Children not enrolled at school (Number of children [%])
Surviving parent/s*		
Both parents	22 (84.61)	04 (15.38)
Father only	05 (62.5)	03 (37.5)
Mother only	04 (26.66)	11 (73.33)
No surviving parent	01 (9.09)	10 (90.9)
Socioeconomic status of the family†		
Socioeconomic Class I	02 (100)	NIL
Socioeconomic Class II	01 (100)	NIL
Socioeconomic Class III	15 (83.33)	03 (16.67)
Socioeconomic Class IV	12 (38.71)	19 (61.29)
Socioeconomic Class V	02 (25)	06 (75)
Severity of the disease‡		
WHO clinical stage 1	05 (50)	05 (50)
WHO clinical stage 2	11 (52.38)	10 (47.62)
WHO clinical stage 3	15 (75)	05 (25)
WHO clinical stage 4	01 (11.11)	08 (88.88)

*Survival of parents vs. schooling: $\chi^2 = 23.429$, DF = 3, $p < 0.0001$.

†Socioeconomic status of family vs. schooling: $\chi^2 = 14.378$, $p = 0.0006$, χ^2 (trend) = 12.257, $p = 0.0005$.

‡Clinical severity vs. schooling: $\chi^2 = 10.271$, $p = 0.0164$, χ^2 (trend) = 0.653, $p = 0.4190$.

Table 4. Prevalence of PEM in HIV-positive Children and Factors Affecting It

Variables	PEM (IAP classification)					
	No PEM	Grade I PEM	Grade II PEM	Grade III PEM	Grade IV PEM	
Clinical severity of disease*						
WHO clinical stage 1	06 (54.54%)	02 (18.18%)	03 (27.27%)	NIL	NIL	11
WHO clinical stage 2	04 (19.04%)	09 (42.86%)	05 (23.8%)	03 (14.28%)	NIL	21
WHO clinical stage 3	02 (8.33%)	08 (33.33%)	03 (12.5%)	09 (37.5%)	02 (8.33%)	24
WHO clinical stage 4	NIL	02 (16.67%)	02 (16.67%)	04 (33.33%)	04 (33.33%)	12
Immunological stage†						
No immunosuppression	08 (34.78%)	09 (39.13%)	05 (21.74%)	01 (4.35%)	NIL	23
Mild Immunosuppression	02 (22.22%)	04 (44.44%)	02 (22.22%)	01 (11.11%)	NIL	09
Advanced immunosuppression	02 (13.33%)	04 (26.67%)	04 (26.67%)	04 (26.67%)	01 (6.66%)	15
Severe immunosuppression	NIL	04 (19.05%)	02 (9.52%)	10 (47.61%)	05 (23.8%)	21
Socioeconomic status of the family‡						
Class I	01 (50%)	NIL	NIL	01 (50%)	NIL	02
Class II	01 (100%)	NIL	NIL	NIL	NIL	01
Class III	06 (31.58%)	05 (26.31%)	04 (21.05%)	04 (21.05%)	NIL	19
Class IV	02 (5.55%)	14 (38.89%)	08 (22.22%)	08 (22.22%)	04 (11.11%)	36
Class V	02 (20%)	02 (20%)	01 (10%)	03 (30%)	02 (20%)	10

*Clinical stage vs. Grade of PEM: χ^2 = 32.233, DF= 12, Contingency coefficient = 0.567, p = 0.0013.

†Immunological stage vs. Grade of PEM: χ^2 = 29.141, DF = 12, Contingency coefficient = 0.548, p = 0.0038.

‡Socioeconomic status of the family vs. Grade of PEM: χ^2 = 18.201, DF = 16, Contingency coefficient = 0.46, p = 0.3123.

Table 5. Comparison of Stunting, Anemia and Vitamin A Deficiency with the CD4 Status

Features		Number of children (%)			
		No immuno-suppression	Mild immuno-suppression	Advanced immuno-suppression	Severe immuno-suppression
Stunting	Yes (n = 17)	02 (11.76)	00	03 (17.65)	12 (70.59)
	No (n = 51)	21 (41.18)	09 (17.65)	12 (23.53)	09 (17.65)
Anemia	Present (n = 21)	03 (14.28)	01 (4.76)	03 (14.28)	14 (66.67)
	Absent (n = 47)	20 (42.5)	08 (17.02)	12 (25.53)	07 (14.89)
Signs of vitamin A deficiency	Present (n = 19)	03 (15.78)	02 (10.52)	05 (26.32)	09 (47.37)
	Absent (n = 49)	20 (40.82)	07 (14.28)	10 (20.41)	12 (24.49)

in 27.9% of the children. There was no significant association between the immunological stage and the prevalence of manifestations of vitamin A deficiency (p = 0.1565).

As depicted in Table 6, 23.5% of the HIV-positive children had no opportunistic infection at the time of enrollment in the study, 27.9% children suffered from 1 opportunistic infection and the rest 48.5% had more than 1 opportunistic infections at the time of being enrolled in the study. The chances of acquiring an opportunistic infection increased significantly as the immunological status of the children deteriorated (p < 0.001). The most common opportunistic infections in these children were pulmonary tuberculosis (27.94%) and oral candidiasis (27.94%). Other common opportunistic infections were pneumonia (20.6%), recurrent skin infections (17.65%), otitis media (16.18%), persistent diarrhea (16.18%), extra-pulmonary tuberculosis (10.29%), scabies (5.88%) and *Pneumocystis jirovecii* pneumonia (4.41%). Pulmonary tuberculosis, candidiasis and otitis media were present at all immunological stages with greater prevalence

at higher levels of immunosuppression. Pneumonia was more prevalent in children with advanced (33.33%) and severe (33.33%) immunosuppression. All children suffering from *P. jirovecii* pneumonia were having CD4 levels consistent with stage of severe immunosuppression. Extrapulmonary tuberculosis had higher prevalence among children with severe immunosuppression (19.05%). There were a total of 29 children whose pre-treatment CD4 and 6 months post-treatment CD4 values were available. Paired CD4 counts of the children pre-treatment and 6 months post-treatment were compared. Mean CD4 count of these children before starting ART was 384.655 ± 268.645. The mean CD4 count of the same group of children after receiving ART for 6 months was 604.241 ± 322.380 with a mean increase of 219.586 ± 173.127. We applied paired sample *t*-test and obtained 't' = 6.830 and $p < 0.0001$ (Table 7).

The mean rise in CD4 count was maximally seen in the age group of 5-10 years (273.823 ± 169.041). There was a significant improvement in CD4 levels on receiving ART

Table 6. Prevalence of Opportunistic Infections at Different Grades of Immunosuppression

Opportunistic infections	Grades of immunosuppression			
	No immuno-suppression (n = 23)	Mild immuno-suppression (n = 09)	Advanced immuno-suppression (n = 15)	Severe immuno-suppression (n = 21)
No opportunistic infection	13 (56.52%)	02 (22.22%)	01 (6.67%)	NIL
P. jirovecii pneumonia	NIL	NIL	NIL	03 (14.28%)
Pulmonary TB (including miliary TB)	04 (17.39%)	01 (11.11%)	03 (20%)	11 (52.38%)
Extrapulmonary TB	01 (4.25%)	01 (11.11%)	01 (6.67%)	04 (19.05%)
Oral/pharyngeal candidiasis	02 (8.69%)	03 (33.33%)	03 (20%)	11 (52.38%)
Recurrent bacterial skin and soft tissue infections	03 (13.04%)	01 (11.11%)	02 (13.33%)	08 (38.09%)
Otitis media	03 (13.04%)	02 (22.22%)	04 (26.67%)	02 (9.52%)
Infective persistent diarrhea	01 (4.25%)	01 (11.11%)	02 (13.33%)	07 (33.33%)
Bacterial pneumonia	01 (4.25%)	01 (11.11%)	05 (33.33%)	07 (33.33%)

Table 7. Efficacy of HAART and the Variables Affecting Response to Treatment

Variables	No. of children	Pre-HAART CD4 (mean ± SD)	Post-HAART CD4 (mean ± SD)	Change in CD4 due to treatment (mean ± SD)	P value
Age					
3-5 years	5	415.00 ± 334.829	551.40 ± 420.409	136.40 ± 212.647	p = 0.224
5-10 years	17	435.706 ± 267.149	709.529 ± 314.848	273.823 ± 169.041	p < 0.0001
10-15 years	7	239.000 ± 197.065	386.285 ± 116.914	147.285 ± 115.448	p = 0.015
Clinical stage					
1	04	653.75 ± 377.792	957.00 ± 371.064	303.250 ± 46.133	p = 0.001
2	10	358.800 ± 216.034	550.70 ± 238.325	191.90 ± 152.569	p = 0.003
3	14	340.500 ± 249.469	566.357 ± 318.65	225.859 ± 208.65	p = 0.001
4	01	185.000	259.000	NA	NA
Within stage, p < 0.001; between stages, p = 0.094					
Immunological stage					
No immunosuppression	8	693.500 ± 275.935	961.875 ± 308.351	268.375 ± 94.892	p < 0.0001
Mild immunosuppression	6	376.500 ± 96.529	480.333 ± 139.648	103.833 ± 128.207	p = 0.104
Advanced immunosuppression	8	319.500 ± 120.844	552.875 ± 199.415	233.375 ± 212.364	p = 0.017
Severe immunosuppression	7	113.143 ± 65.098	360.429 ± 229.498	247.286 ± 212.979	p = 0.022
Within stage, p < 0.001; between stages, p < 0.001					

Table 8. Hospitalization in HIV-positive Children

Variable	Number of admissions N = 13 (%)
WHO clinical stage of disease	
Clinical stage 1	NIL
Clinical stage 2	NIL
Clinical stage 3	05 (38.46)
Clinical stage 4	08 (61.54)
Immunological status of the child	
No immunosuppression	NIL
Mild immunosuppression	NIL
Advanced immunosuppression	02 (15.39)
Severe immunosuppression	11 (84.61)

in children irrespective of their clinical stages. The mean rise in CD4 levels in children with no, mild, advanced and severe immunosuppression were 268.375 ± 94.892, 103.833 ± 128.207, 233.375 ± 212.364 and 247.286 ± 212.979, respectively. Of those who reported at follow-up after starting ART, 49.09% experienced adverse effects to ART. The commonest reported adverse effect was gastritis, which was present in 81.5% of those who reported adverse effects. It was the most common event causing decreased compliance to HAART.

A total of 13 (19.12%) children in our study required hospitalization during the 1½ year study period. The most common indication for hospitalization was pneumonia, responsible for 61.5% of the hospitalizations. Of these, 38.46% of children were in clinical stage 3 and 61.54% were in WHO clinical stage 4. No child with HIV in clinical stage 1 or 2 required hospitalization. It was seen that 15.4% of children who required admission had CD4 levels consistent with stage of advanced immunosuppression and the rest 84.6% children who were hospitalized had CD4 levels consistent with stage of severe immunosuppression (Table 8).

DISCUSSION

The mean age at diagnosis was 6.54 ± 2.69 years. Most of these children were diagnosed as a part of screening after parental diagnosis. Delayed diagnosis implies delayed initiation of treatment. In the study by Shah et al, mean age at diagnosis was 4.5 ± 2.9 years.[3] The male-to-female sex ratio in our study was 2.579:1, which is similar to previous studies.[4-7] However, this difference is not statistically significant (p = 0.7965) at the current sample size. As many as, 95.58% of children in our study had acquired the infection through mother-to-child transmission. Previous studies showed a significant transmission to occur through blood transfusion,[8-10] which has decreased now, due to compulsory screening of donor blood for HIV.

The clinical features in our study were similar to previous studies.[3,7-9,11-13] There was a very strong correlation between the clinical and the immunological stages of HIV in children (correlation coefficient, r = 0.6708, p < 0.0001). A previous study had showed good correlation.[9] When we assessed the clinical features with regards to CD4 count, we noticed that while most of the signs and symptoms were present at all CD4 levels, 'failure to thrive', 'recurrent skin infection (pyoderma)' and 'abscesses' occurred when CD4 levels of the children fell very low (stage of severe immunosuppression).

On analysis of the variables affecting schooling in these children, we found that orphan-hood (p < 0.0001) and poor socioeconomic status (p = 0.0003) were significant contributor to school absenteeism. In contrast, clinical severity as determined by higher clinical staging did not affect school absenteeism.

PEM was present in 82.36% of children. The factors affecting the severity of malnutrition were clinical stage (p = 0.0013) and immunological stage (p = 0.0038) implying that it's the severity of infection evidenced by clinical and immunological stages that is a significant contributor towards malnutrition in children. Stunting and anemia were late features in HIV. Children in stage of severe immunosuppression accounted for 70% and 66.67% of cases of stunting and anemia, respectively. Signs of vitamin A deficiency occurred early in the course of the disease.

The chances of acquiring an opportunistic infection increased significantly as the immunological status of the children deteriorated (p < 0.001). The most common opportunistic infections in these children were pulmonary tuberculosis (27.94%) and oral candidiasis (27.94%). This is in accordance with previous studies.[7,8,14] Pulmonary tuberculosis, candidiasis and otitis media occurred at higher CD4 levels but their prevalence increased with increasing levels of immunosuppression. Pneumonia was more prevalent in children with advanced (33.33%) and severe (33.33%) immunosuppression. All children suffering from *P. jirovecii* pneumonia and extrapulmonary tuberculosis were seen when CD4 levels fell to the stage of severe immunosuppression (19.05%). All the opportunistic infections occurred at greater frequency than the Pediatric AIDS Clinical Trials Group (PACTG) study trial.[15]

HAART resulted in significant rise in CD4 levels after 6 months of therapy. The maximum response to HAART was seen in the age group of 5-10 years. There was significant rise in CD4 count irrespective of the clinical staging. But, the best response of HAART in terms of raising CD4 count was seen when therapy was initiated in children with lesser immunosuppression, i.e., higher baseline CD4 count. Hence, early initiation of ART at higher CD4 levels may be more beneficial rather than waiting for the CD4 count to fall below the current cut-off as per WHO guidelines. Gastritis was the most commonly reported adverse effect of HAART and it was also the major cause of decreased compliance to therapy. About 19% of HIV-positive children required admission every year with pneumonia being the most common cause of admission among them. Average duration of hospital stay was 8.84 ± 4.35 days. The frequency of hospitalization increased as the clinical and immunological stage of the child's illness increased; 38.46% of children requiring admission were in clinical stage 3 and 61.54% were in WHO clinical stage 4. No child with HIV in clinical stage 1 or 2 required hospitalization. Similarly, 15.4% and 84.6% of admitted children had CD4 levels consistent with advanced and severe immunosuppression, respectively.

CONCLUSION

The clinical and immunological stagings have good correlation and hence in the absence of facilities for carrying out CD4 count, clinical staging is a suitable alternative for monitoring these children. The timing of appearance of various clinical features with regards to the CD4 count can be summarized as follows: *Mild immunosuppression*: Vitamin A deficiency, pulmonary tuberculosis, candidiasis, otitis media, decreased weight for age, hepatosplenomegaly and lymphadenopathy; *Advanced immunosuppression*: Bacterial pneumonia; *Severe immunosuppression*: Anemia, stunting, pyoderma, abscesses, *P. jirovecii* pneumonia and extrapulmonary tuberculosis. HAART causes significant rise in CD4 count at 6 months of treatment. The best effect is seen when HAART is initiated at higher baseline CD4 count. HAART is very well-tolerated in children with good compliance. Gastritis is the major limiting side effect. Early diagnosis and early initiation of treatment will reduce the morbidity and mortality associated with HIV.

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Pulmonary Function Tests in Metabolic Syndrome

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ABSTRACT

Background: The prevalence of metabolic syndrome varies around the world. It reflects the age and ethnicity of the populations involved in the study and the diagnostic criteria applied. Impaired pulmonary function has been reported to be associated with insulin resistance and metabolic abnormalities. There is increasing evidence that impaired lung function is more than a simple reflection of airflow limitation; it may also be a marker of premature death. This study has been conducted to find out the association between suspected pulmonary involvement, as assessed by pulmonary function tests and metabolic syndrome, as well as the correlation between metabolic abnormalities and lung compliance in an apparently healthy population. **Material and methods:** Patients evaluated/admitted for minor ailments to Victoria Hospital and Bowring and Lady Curzon Hospital attached to Bangalore Medical College and Research Institute who fulfilled the criteria for metabolic syndrome were treated and pulmonary function tests were carried out after taking consent from the patients. **Results:** Among 50 patients, normal pulmonary function tests was seen in 20 patients and remaining 30 patients showed deranged pulmonary function tests. Among them, 15 patients showed forced expiratory volume in 1 second (FEV1) less than lower limit of normal and FEV1/FVC (forced vital capacity) ratio less than lower limit of normal (obstructive pattern) and 15 patients showed FVC less than lower limit of normal and FEV1/FVC ratio more than lower limit of normal (restrictive pattern). **Conclusion:** There is a positive association between metabolic syndrome and lung function impairment. Both obstructive and restrictive pattern is seen with metabolic syndrome. However, there was no independent correlation between individual metabolic syndrome components and pulmonary function tests.

Keywords: Metabolic syndrome, impaired lung function, pulmonary function tests, obstructive pattern, restrictive pattern

The prevalence of metabolic syndrome varies around the world. It reflects the age and ethnicity of the populations involved in the study and the diagnostic criteria applied. Greater industrialization is associated with rising rates of obesity, diabetes, hypertension which is anticipated to increase prevalence of the metabolic syndrome dramatically, especially as the age of the population increases. The mechanisms underlying the relationship between impaired lung function and cardiovascular risk are unclear.[1]

Impaired pulmonary function has been reported to be associated with insulin resistance and metabolic abnormalities. There is increasing evidence that impaired lung function is more than a simple reflection of airflow limitation; it may also be a marker of premature death.[2] Several large prospective studies have shown that lung function impairment was predictive of increased cardiovascular morbidity and mortality, independent of smoking.[3,4] Positive associations with lung function impairment have been reported for major cardiovascular risk factors, such as hypertension,[5,6] type 2 diabetes mellitus,[7-9] dyslipidemia and overall obesity.[10,11]

This study has been conducted to find out the association between suspected pulmonary involvement, as assessed by pulmonary function tests and metabolic syndrome, as well as the correlation between metabolic abnormalities and lung compliance in an apparently healthy population.

MATERIAL AND METHODS

Patients evaluated/admitted for minor ailments like fever, common cold, bodyache, etc. attending the inpatient and outpatient clinics were included in the study. Patients were treated for their minor illness and pulmonary function tests were carried out after taking consent from the patient. Fifty patients who fulfilled the criteria for metabolic syndrome were included in the study. The study was conducted over a period of 2 years.

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Inclusion Criteria

According to the International Diabetes Federation (IDF) criteria, waist circumference >90 cm in males >80 cm in females, triglycerides >150 mg/dL or on specific medication, low high-density lipoprotein (HDL) cholesterol: <40 mg/dL and <50 mg/dL in men and women, respectively, or on specific medication, blood pressure >130 mm systolic or >85 mm diastolic or on specific medication, fasting plasma glucose: ≥100 mg/dL or specific medication or previously diagnosed type 2 diabetes mellitus/impaired fasting glucose/impaired glucose tolerance/diabetes mellitus.

Exclusion Criteria

Patients with cardiopulmonary diseases, neuromuscular disorders, musculoskeletal disorders, in postoperative state, any serious systemic illnesses, endocrine abnormalities (hypothyroidism, Cushing's syndrome, etc.), individuals below 18 years of age and smokers were excluded from the study.

Waist circumference (in cm) was measured at a point midway between the lower rib and iliac crest, in a horizontal plane, measured to the nearest 0.1 cm. Blood pressure was measured after patient resting for about 15 minutes.

All the maneuvers were performed in sitting position and at rest. A thorough instruction was given to each subject about the performance of the maneuvers, most of the times we demonstrated to them by doing the maneuvers ourselves on the machine. Every subject was given ample time to understand carefully, every part of the procedure and was asked to perform it number of times before we selected the best one. A soft nose chip was put over the nose to occlude the nostrils, disposable mouthpieces were used to minimize cross infection.

RESULTS

In our study, the total number of patients with metabolic syndrome were 50. Maximum number was in the age group of 51-60 (34%) followed by 61-70 (30%). The youngest patient was 30 years old and the oldest was 80 years old. Mean age group was 57.06 ± 12.40. Our study included 28 male patients (56.0%) and 22 female patients (44.0%). Mean height and weight of patients in our study were 1.59 ± 0.06 and 79.18 ± 6.52, respectively. The mean waist circumference and body mass index (BMI) were 97.34 ± 15.42 and 31.39 ± 1.86, respectively. The mean fasting blood sugar (FBS) and postprandial blood sugar (PPBS) in our study was 164.02 ± 28.02 and 251.82 ± 47.03, respectively. The mean level of triglycerides and HDL in our study were 205.58 ± 37.37 and 27.90 ± 6.55, respectively (Table 1). There was no significant differences between males and females among the investigations done and the pulmonary function tests performed.

Table 1. Comparison of Clinical and Study Variables According to Gender

Variables	Gender		P value
	Male	Female	
Age in years	59.57 ± 12.66	53.68 ± 11.57	0.107
WC (cm)	100.00 ± 20.05	93.95 ± 4.08	0.171
BMI (kg/m^2)	31.10 ± 1.44	31.77 ± 2.27	0.219
Pulse (bpm)	80.17 ± 5.81	78.45 ± 7.22	0.354
SBP (mmHg)	145.50 ± 5.03	145.45 ± 7.09	0.979
DBP (mmHg)	87.79 ± 5.79	89.82 ± 5.27	0.207
FBS (mg/dL)	168.61 ± 28.98	158.18 ± 26.25	0.195
PPBS (mg/dL)	255.25 ± 46.40	247.45 ± 48.55	0.566
Urea (mg/dL)	29.00 ± 7.86	21.36 ± 7.61	0.001
Creatinine (mg/dL)	0.89 ± 0.23	0.85 ± 0.28	0.518
TC (mg/dL)	248.82 ± 30.02	251.32 ± 29.14	0.769
HDL (mg/dL)	27.61 ± 7.02	28.27 ± 6.05	0.725
LDL (mg/dL)	176.5 ± 21.53	177.45 ± 19.6	0.872
TGs (mg/dL)	203.04 ± 35.18	208.82 ± 40.6	0.592
FVC	2.09 ± 1.00	2.35 ± 1.04	0.369
FEV1	1.67 ± 0.87	1.73 ± 0.92	0.821
FEV1/FVC (%)	78.66 ± 11.69	72.76 ± 13.46	0.108
PEF	3.43 ± 2.12	3.74 ± 2.42	0.635
MEF_{25}	0.99 ± 0.73	0.88 ± 0.56	0.576
MEF_{50}	2.01 ± 1.20	1.85 ± 1.23	0.651
MEF_{75}	2.89 ± 1.74	2.94 ± 1.94	0.916
PIF	2.91 ± 1.66	2.62 ± 1.71	0.559
T3	109.28 ± 26.93	122.27 ± 25.32	0.089
T4	7.84 ± 2.20	7.10 ± 1.23	0.165
TSH	3.37 ± 0.77	2.67 ± 0.92	0.005

WC = Waist circumference; BMI = Body mass index; SBP = Systolic blood pressure; DBP = Diastolic blood pressure; FBS = Fasting blood sugar; PPBS = Postprandial blood sugar; TC = Total cholesterol; HDL = High-density lipoprotein; LDL = Low-density lipoprotein; TG = Triglyceride; FVC = Forced vital capacity; FEV1 = Forced expiratory volume in 1 second; PEF = Peak expiratory flow; MEF = Maximal expiratory flow; PIF = Peak inspiratory flow; T3 = Triiodothyronine; T4 = Thyroxine; TSH = Thyroid-stimulating hormone.

Table 2. Distribution of Pulmonary Function Test of Patients Studied

Variables	Number of patients (n = 50)	Percentage (%)
FVC		
<2.09	19	38.0
>2.09	31	62.0
FEV1/FVC (%)		
<76	15	30.0
76-94	33	66.0
>94	2	4.0

In our study, 19 (38%) patients had forced vital capacity (FVC) less than lower limit of normal. And 31 (68%) patients had FVC more than lower limit of normal. Forced expiratory volume in 1 second (FEV1)/FVC ratio less than 76% was found in 15 (30%) patients and FEV1/FVC ratio between 76-94% was found in 33 (66%) patients and more than 94% was seen in 2 (4%) patients. Among 50 patients, normal pulmonary function test was seen in 20 patients and remaining 30 patients showed deranged pulmonary function tests. Among them, 15 patients showed FEV1 less than lower limit of normal and FEV1/FVC ratio less than lower limit of normal (obstructive pattern) and 15 patients showed FVC less than lower limit of normal and FEV1/FVC ratio more than lower limit of normal (restrictive pattern) (Table 2).

According to our study, there was no independent correlation between individual metabolic syndrome components and pulmonary function tests. Pearson's correlation co-efficient R value showed trivial correlation between individual component of metabolic syndrome and pulmonary function tests (Table 3).

Table 3. Pearson Correlation of Components of Metabolic Syndrome with Pulmonary Function Tests

Parameters	R value
WC vs. FEV1	-0.09696
WC vs. FVC	-0.08715
WC vs. FEV1/FVC	-0.0937
BMI vs. FEV1	-0.07883
BMI vs. FVC	-0.04362
BMI vs. FEV1/FVC	0.008287
HDL vs. FEV1	-0.03478
HDL vs. FVC	0.025457
HDL vs. FEV1/FVC	-0.19903
LDL vs. FEV1	-0.12261
LDL vs. FVC	-0.09532
LDL vs. FEV1/FVC	0.131155
TG vs. FEV1	0.100789
TG vs. FVC	0.14708
TG vs. FEV1/FVC	0.080905
FBS vs. FEV1	0.127207
FBS vs. FVC	0.091231
FBS vs. FEV1/FVC	0.264271

STATISTICAL METHODS

Student *t*-test (two-tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Levene's test for homogeneity of variance has been performed to assess the homogeneity of variance.

DISCUSSION

The present study was done to determine pulmonary function tests in metabolic syndrome as well as to determine the relation between individual component of metabolic syndrome and pulmonary function tests.

Many studies concluded that pulmonary function drops among obese people.[12,13] Previously, studies have used BMI, waist circumference, waist/hip circumference ratio, abdominal thickness (height) and skin thickness test as the markers that show obesity.[14,15] The study included 50 patients of metabolic syndrome. Patients were evaluated with detailed history, meticulous examination and laboratory investigations. Laboratory investigations included fasting lipid profile, FBS, PPBS level, thyroid function tests, ECG, chest X-ray and pulmonary function tests.

Study by Kim et al[16] showed that FVC values were significantly lower in the metabolic syndrome group compared with those of the nonmetabolic syndrome. The results of study suggested that decreased vital capacity in Korean adult male subjects are associated with metabolic syndrome. In our study, FVC <2.09 (lower limit of normal FVC) was found in 19 (38%) patients of which 4 patients had FEV1/FVC less than 76.0% (lower limit of normal FEV1/FVC) and remaining 15 patients had FEV1/FVC more than 76.0%.

In our study, the mean value of FEV1/FVC is 76.01 ± 12.73%. The mean FEV1/FVC in nonobese Indian is 85 ± 9%. In a study by Leone et al,[1] mean FEV1/FVC was 81.3 ± 7.8%. In a study by Nakajima et al,[17] the FEV1/FVC mean value was 81.7 ± 6.3%.

Among 50 patients, normal pulmonary function test was seen in only 20 patients, while the remaining 30 patients showed deranged pulmonary function tests. Among them, 15 patients showed FEV1 less than lower limit of normal and FEV1/FVC ratio less than lower limit of normal (obstructive pattern) and 15 patients showed FVC less than lower limit of normal and FEV1/FVC ratio more than lower limit of normal (restrictive pattern).

In a study by Leone et al[1] involving 1,21,965 patients; it was concluded that lung function impairment and metabolic syndrome had a positive independent relationship mainly due to abdominal obesity. All factors were inversely related to lung function but abdominal obesity was the strongest predictor of lung function impairment.

In population-based survey done by Lam et al,[18] 7,358 patients underwent spirometry, a structured interview and measurement of fasting metabolic marker levels. In this study also, it was concluded that airflow obstruction was associated with metabolic syndrome and in particular its central obesity component.

However, in a study by Kim et al[16] which included 1,951 male patients, it was seen that decreased vital capacity in Korean adult male subjects was associated with metabolic syndrome irrespective of obesity. In metabolic syndrome group, both FEV1 and FVC values, but not FEV1/FVC ratio were lower than the subjects in nonmetabolic syndrome.

In another study on 2,396 apparently healthy adults, Nakajima et al[17] came to the conclusion that impaired restrictive pulmonary function, but not obstructive pattern might be associated with metabolic disorders and metabolic syndrome in a severity dependent manner.

Bae et al,[19] in a study on 1,370 Korean patients, found that in men, all metabolic syndrome components were associated with pulmonary function impairment and the more metabolic syndrome components men had, the more severe was their pulmonary function decline. In women, no components of metabolic syndrome were associated with pulmonary function impairment.

In the Strong Heart Study (SHS), a multicenter, prospective study involving 2,396 patients, Yeh et al[20] concluded that reduced lung function was independently associated with metabolic syndrome and with diabetes mellitus, and impaired lung function presents before the development of metabolic syndrome or diabetes mellitus; these associations may have resulted from the effects of obesity and inflammation.

A study by Lin et al[21] involving 46,514 patients concluded that obesity and metabolic syndrome were associated with impaired lung function in adults in Taiwan. Results implied that obesity and insulin resistance may be the common pathways underlying lung function impairment and metabolic syndrome. Moreover, lung function test may be applied as an additional evaluation for metabolic syndrome in a clinical setting.

Costa et al,[22] conducted a study in 40 women, 20 obese and 20 nonobese, and concluded that the alterations evidenced in the components of the vital capacity (inspiratory reserve volume and expiratory reserve volume) suggest damage to the chest mechanics was caused by obesity and probably contributed to a reduction of the maximal voluntary ventilation.

In a study by Fimognari et al[23] on 159 consecutive nondiabetic elderly persons attending two social centers, it was concluded that, restrictive, but not obstructive respiratory pattern, is associated with metabolic syndrome and insulin resistance, and does not only reflect a limitation of ventilation due to visceral obesity. Metabolic abnormalities likely mediate cardiovascular risk in patients with restrictive respiratory impairment.

According to a study done on 50 patients with in type 1 diabetes mellitus by Makkar et al,[24] spirometric evaluation showed varying derangements in the different parameters of pulmonary function tests, suggestive of dominantly restrictive with some obstructive pattern as indicated by significant decline in FVC, peak expiratory flow rate (PEFR) and maximum expiratory flow at 75% (MEF_{75}).

We found a positive independent relationship between lung function impairment and metabolic syndrome. However, there was no independent correlation between individual metabolic syndrome components and pulmonary function tests according to our study. We observed that metabolic syndrome was associated with both obstructive and restrictive pattern of lung impairment. Metabolic syndrome remained independently associated with lung function impairment.

CONCLUSION

There is a positive association between metabolic syndrome and lung function impairment. Both obstructive and restrictive pattern is seen with metabolic syndrome. However, there was no independent correlation between individual metabolic syndrome components and pulmonary function tests.

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Sudden Loss of Taste can Last for 1 Month in COVID-19

Loss of Taste and Smell can Coexist with a Skin Rash

KK AGGARWAL*, SANCHITA SHARMA†, NILESH AGGARWAL‡

ABSTRACT

Coronavirus disease (COVID-19) is an ongoing public health crisis. Most patients usually have the common symptoms of cough, fever, breathlessness, but some patients have unusual or atypical symptoms, which could result in misdiagnosis and risk of further transmission of infection. In this short case report, we describe a patient who had sudden anosmia and dysgeusia and rash on her hands, besides mild cough and fever. She tested positive for COVID-19. The loss of taste persisted for more than a month. Until its advent in the form of an outbreak in Wuhan, China, COVID-19 was an unknown disease. Since then, every day we are learning something new about the disease in terms of its clinical presentation, diagnosis and treatment. New symptoms are being identified. A sudden onset of anosmia and dysgeusia in a patient during the pandemic should not be ignored. There should be a high index of suspicion for COVID-19. These symptoms can co-exist with a skin rash.

Keywords: COVID-19, atypical symptoms, anosmia, dysgeusia, rash, suspicion

The patient was a young woman in Spain. She attended a marriage in India and returned to Spain in a hotspot area and was on a regular teleconsultation with me.

At the start of the illness, on 13th March, 2020, the first symptom was pain in legs (muscle pain or myalgia), which preceded all other symptoms. On the second day, the patient developed mild fever, ranging from 37.6°C to 37.8°C. The fever was not persistent. She was afebrile on some days. Patient had cough, but it was again mild. She also experienced some stomach problems for 2 days. This was followed by sudden loss of taste and smell. The patient also had some rash on hands (both front and back sides), which she initially attributed to the frequent use of sanitizer to clean hands. Since her mother shared the same house, she too developed similar symptoms; however, the intensity of symptoms was much less. She only had 1-2 days of fever, slight cough and loss of taste and smell. The patient's mother too has not completely regained the sensation of taste.

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Both were confirmed with coronavirus disease (COVID-19). This is the first report that loss of taste can last for over a month.

DISCUSSION

COVID-19 is a new virus infection causing involvement of any organ. New data is emerging every day.

The most common symptoms of COVID-19 are fever, tiredness and dry cough. Some patients may have aches and pains, nasal congestion, runny nose, sore throat or diarrhea. These symptoms are usually mild and begin gradually. About 80% recover from the disease without needing special treatment. Around 1 out of every 6 people becomes seriously ill and develops difficulty breathing.[1]

This patient was a mild case of COVID-19. She had the typical symptoms of COVID-19, which are fever and cough. The symptoms were mild in nature. The patient also had sudden loss of taste and smell.

Loss of smell (anosmia), with or without loss of taste (dysgeusia) has been reported early in the disease process as well as in patients with mild or no constitutional symptoms.[2]

A study published online April 12 in the journal *International Forum of Allergy & Rhinology* found that loss of smell and taste had a strong association

with COVID-19 positivity and suggested that these symptoms should be taken into consideration when screening the patient. Sixty-eight percent of COVID-19-positive patients reported anosmia, while 71% reported dysgeusia vis-à-vis 16% and 17%, respectively of COVID-19-negative patients.[3]

In a CDC *Morbidity and Mortality Weekly* report dated April 14, 2020, 16% of healthcare personnel with COVID-19 infection listed "loss of smell or taste" as an "other" symptom.[4]

Hence, *Lancet Infectious Diseases* recommended in an article published on April 15, 2020 that "*physicians evaluating patients with acute-onset loss of smell or taste, particularly in the context of a patent nasal airway (i.e., nonconductive loss), should have a high index of suspicion for concomitant severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) infection.*"[2]

In the *International Forum of Allergy & Rhinology* study, 74% of patients recovered their sense of smell with clinical resolution of illness[3]; however, the sequelae of loss of smell and taste may persist for more than 4 weeks in some cases as also in the present case. The onset of loss of taste and smell was sudden, but the recovery is gradual. It has been more than a month, but both the patient and her mother have still not fully recovered their sensation of taste and smell.

The American Academy of Otolaryngology-Head & Neck Surgery has proposed adding anosmia and dysgeusia to the list of screening symptoms for potential COVID-19. "*Anosmia, hyposmia and dysgeusia in the absence of other respiratory disease such as allergic rhinitis, acute rhinosinusitis or chronic rhinosinusitis should alert physicians to the possibility of COVID-19 infection and warrant serious consideration for self-isolation and testing of these individuals.*"[5]

The CDC has included "new loss of taste or smell" as a symptom on its COVID-19 information page.[6] The WHO is yet to do so.[7]

This patient also had rash on her hands, which she thought was due to use of alcohol-based sanitizer and refuted this assumption herself as many people use sanitizers without any skin reaction.

About 20.4% of COVID patients have cutaneous manifestations.[8] But these have not been much talked about. These skin manifestations range from erythematous rash to localized or widespread urticaria[9] to chickenpox-like vesicles[10] or chilblains-like lesions.[11] A skin rash with petechiae has also been described as a possible initial presentation of COVID-19 disease.[9]

Skin rashes are emerging as another possible symptom of COVID-19. A patient with COVID-19 might initially present with a skin rash that can be misdiagnosed as another common disease such as dengue. As some patients may be afebrile, it is important that the physician keep COVID-19 in mind when a patient with skin rash presents for consultation. This is important to prevent transmission of infection.[12]

Lesson

Do not ignore loss of smell and taste. Loss of taste can last for over a month. Loss of taste and smell can coexist with a skin rash.

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Significant Drop in Air Pollution Levels in 18 Days of COVID-19 Lockdown in Delhi-NCR

KK AGGARWAL*, ANIL KUMAR†

About 60% reduction in air pollution levels (PM10 and PM2.5 average values - 24 hourly) in Delhi-NCR after 18 days of lockdown (at the time of writing this article).

During worldwide coronavirus disease (COVID-19) lockdown, lack of human activity has proven healthy for the planet's well-being as multiple locations around the world, that were previously known for their severe air pollution levels, have shown significant improvement.

Stringency Index: The Stringency Index for India is 100. This index is based on data from 13 indicators of government response, as below. Nine are based on government policy, while the rest are financial indicators.

1. Closure of schools
2. Closure of workplaces
3. Canceling public events
4. Closing public transports
5. Launching public communication strategies
6. Restriction of internal movements
7. International travel control
8. Fiscal measures
9. Monetary measures
10. Emergency investment on healthcare
11. Investment in vaccine
12. Testing policy
13. Contact tracing

Delhi-NCR has always been one of the highly air polluted regions in India with excessive levels of harmful microscopic particulate matter (PM) known as PM2.5, and of nitrogen dioxide (NO_2). The air pollution arising from all the soot and smoke from the factories and vehicles on the roads has become a very serious health issue.

PM2.5, which is smaller than 2.5 μm in diameter, is dangerous as it can get lodged deep inside the lungs and pass into other parts of the body through the bloodstream, causing health risks. NO_2 is a toxic gas causing inflammation of the airways at higher concentrations.

In Delhi, lockdown is effective from 23-03-2020 with almost no movement of people and vehicles on roads in last 18 days (*at the time of writing this article*); only vehicles related to essential services are moving on roads. This has resulted in improved air quality in Delhi.

In Delhi, the major pollutants are PM10 and PM2.5. Like other major cities in India, Delhi-NCR has seen a drastic drop in these suffocating pollution levels since the full lockdown due to the COVID-19 pandemic. As per Central Control Room for Air Quality Management – Delhi-NCR, the comparison of average values (24 hourly) of PM10 and PM2.5 in Delhi-NCR from 21-03-2020 to 09-04-2020 is as follows:

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Comparison of PM10 Average Values (24 Hourly) Before and After Lockdown in Delhi-NCR			
Time	**PM10 (Standard – 100 µg/m^3) on 21-03-2020** (the day before Janta curfew)	**PM10 (Standard – 100 µg/m^3) on 09-04-2020** (18th day of lockdown in Delhi)	**% reduction in PM10 values** after lockdown in Delhi-NCR
6:00 AM	203.4	78.3	61.50
12 Noon	188.4	82.3	56.31
6:00 PM	187.4	77.8	58.48
11:00 PM	184.0	82.0	55.43

Comparison of PM2.5 Average Values (24 Hourly) Before and After Lockdown in Delhi-NCR			
Time	**PM2.5 (Standard – 60 µg/m^3) on 21-03-2020** (the day before Janta curfew)	**PM2.5 (Standard – 60 µg/m^3) on 09-04-2020** (18th day of lockdown in Delhi)	**% reduction in PM2.5 values** after lockdown in Delhi-NCR
6:00 AM	87.0	30.3	65.17
12 Noon	79.0	33.8	57.21
6:00 PM	79.5	33.2	58.23
11:00 PM	80.4	35.8	55.47

The lockdown enforced due to the COVID-19 has shown it is possible to tackle air pollution issues. What is needed is political will, societal interventions and strict enforcement.

■■■■

Link Between Atopic Dermatitis and Bacterial, Fungal, Viral and Sexually Transmitted Skin Infections

Atopic dermatitis (AD) has often been linked with altered skin barrier, microbiome and immune dysregulation that tends to heighten the risk of skin infections.

A recent study assessed if AD is associated with skin infections and related outcomes. Data were analyzed from the 2006 to 2012 National Emergency Department Sample (198, 102, 435 adults or children).

Skin infections were found to be higher in emergency department (ED) visits of adults (7.14% vs. 3.76%) and children (5.15% vs. 2.48%) with AD. Multivariable logistic regression models revealed that AD was associated with a significantly higher likelihood of skin infection in adults (adjusted odds ratio [95% confidence interval] = 1.93 [1.89-1.97]) as well as children (2.23 [2.16-2.31]).

AD in children as well as adults was noted to be linked with significantly higher odds of carbuncle/furuncles, impetigo, cellulitis, erysipelas, methicillin-resistant and methicillin-sensitive *Staphylococcus aureus* infections, molluscum contagiosum, cutaneous warts, herpes simplex and zoster viruses, eczema herpeticum, dermatophytosis and candidiasis of skin/nails and vulva/urogenitals.

Of note, adults with AD had a higher likelihood of genital warts (1.51 [1.36-1.52]) and herpes (1.23 [1.11-1.35]).

It was concluded that AD patients were more likely to have multiple bacterial, viral, fungal and sexually transmitted skin infections.

Source: Ren Z, Silverberg JI. Dermatitis. 2020;31(2):157-64.

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A Significant Drop in Air Pollution Levels Across India After About a Month of COVID-19 Lockdown

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The levels of NO_2 and ozone across India are within the National Ambient Air Quality Standards.

No clear relationship observed between current air quality vs. confirmed COVID-19 cases in India.

During the coronavirus disease (COVID-19) pandemic and lockdown enforced thereby, countries across the world have reported a significant drop in air pollution and witnessed improvement in air quality.

In India, the most significant improvement in air quality during lockdown was observed in cities across the Indo-Gangetic plain as in most of the normal days, particularly in winter months. The particulate matter (PM10 and PM2.5 levels) and nitrogen dioxide (NO_2) values are usually high in the Indo-Gangetic plain due to geographical location and other factors, including very high population density and spread of industrial clusters.

PM10 (particulate matter 10 μm or less in diameter) and PM2.5 (particulate matter 2.5 μm or less in diameter) are particles present in the air that are classified as pollutants and can harm human health. The deadliest particle in Delhi's foul air is PM2.5 (primarily comes from combustion - fires, automobiles and power plants), which increases the likelihood of respiratory and cardiovascular diseases.

As per an earlier analysis done by a Team of Experts of Heart Care Foundation of India (HCFI), after 18 days of COVID-19 lockdown, the level of particulate pollution (particulate matter, PM10 and PM2.5) dropped by nearly 60% in Delhi.

Studies have been conducted across the globe to get a clear relationship between air pollution exposure and COVID-19 confirmed cases as high levels of air pollution can damage the lungs and thus make one more susceptible to either getting the infection or developing complications from COVID-19. The World Economic Forum has also said that people living with poor air quality may be more susceptible to COVID-19 disease.

A recent study with respect to exposure to air pollution and COVID-19 mortality in the United States by Xiao Wu, et al of Dept. of Biostatistics, Harvard TH Chan School of Public Health, USA, indicates that coronavirus patients in areas with high levels of air pollution before the pandemic, have increased the odds of dying from the infection compared to patients in cleaner parts of the country.

The authors in above study found that an increase of only 1 $\mu g/m^3$ in PM2.5 is associated with an 8% increase in the COVID-19 death rate. Results are statistically significant and robust to secondary and sensitivity analyses. They have concluded that a slight increase in long-term exposure to PM2.5 results in a large increase in COVID-19 death rate.

The study results highlight the importance of continuous enforcement of existing air pollution regulations to protect human health both during and after the COVID-19 crisis. This study offers the first clear association between long-term exposure to pollution and COVID-19 death rates.

In this regard, the Team of Experts of HCFI has done a detailed analysis of air quality data (Air Quality Index [AQI], PM10, PM2.5, NO_2 and ozone) from about 180 Continuous Ambient Air Quality Monitoring Stations (CAAQMS) across India and correlated with confirmed COVID-19 cases. The status of confirmed COVID-19 cases of various States/Union Territories (UTs) as on 21-04-2020 and corresponding State/UT-wise air quality

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status (as per average Central Pollution Control Board (CPCB)/State Pollution Control Board (SPCB) data w.r.t. National Air Quality Index as on 21-04-2020 at 4:00 PM) is given below in the table:

State/UT	Confirmed COVID-19 cases	Air Quality status (PM10, PM2.5, NO_2 and ozone) ($\mu g/m^3$)							
		AQI range	City	CAAQMS location	AQI	PM10	PM2.5	NO_2	Ozone
Andhra Pradesh	722	38-52	Amaravati	Secretariat	52	52	18	30	13
			Rajamahendravaram	Anand Kala Kshetram	38	16	9	5	38
			Tirupati	Tirumala	39	13	10	8	39
			Visakhapatnam	GVM Corporation	52	52	18	30	13
Bihar	113	49-139	Gaya	Collectorate	96	-	48	21	96
			Muzaffarpur	Collectorate	61	-	34	30	61
			Patna	Govt. High School	108	108	26	11	4
				Muradpur	64	64	40	17	9
				Rajbansi Nagar	49	49	30	-	21
				Samanpura	139	49	47	30	53
Chandigarh	26	30	Chandigarh	Sector-25	30	30	22	15	29
Delhi	2,081	55-163	Delhi	Alipur	94	94	54	26	67
				Anand Vihar	84	84	77	21	56
				Aya Nagar	62	62	56	18	26
				Bawana	118	118	100	22	89
				CRRI	77	77	56	18	14
				DTU	97	86	61	22	97
				Dwarka Sector-8	89	84	50	20	89
				IGI Airport	64	64	45	-	34
				IHBAS	68	-	20	-	-
				JLN Stadium	89	70	43	18	89
				Lodhi Road	64	64	-	-	64
				National Stadium	66	66	59	19	31
				Mandir Marg	72	72	51	34	20
				Nehru Nagar	163	79	68	22	163
				Okhla Phase-2	89	-	42	19	6
				Patparganj	55	55	41	12	35
				Punjabi Bagh	77	77	65	34	31
				RK Puram	63	63	43	25	46

State/UT	Confirmed COVID-19 cases	Air Quality status (PM10, PM2.5, NO_2 and ozone) (µg/m^3)							
		AQI range	City	CAAQMS location	AQI	PM10	PM2.5	NO_2	Ozone
				Rohini	98	98	89	11	19
				Shadipur	81	-	26	27	81
				Siri Fort	64	64	45	19	60
				Sri Aurobindo Marg	121	48	37	6	121
				Vivek Vihar	87	87	62	30	52
				Wazirpur	75	75	67	33	45
Gujarat	1,939	51-75	Ahmedabad	Maninagar	72	72	47	17	60
			Ankleshwar	GIDC	75	75	51	6	47
			Gandhi Nagar	Sector-10	56	56	34	4	31
			Nandesari	GIDC	51	49	28	51	-
			Vatva	Phase-4 GIDC	69	69	53	31	24
Haryana	254	25-165	Ambala	Patti Mehar	42	-	39	21	42
			Bahadurgarh	Arya Nagar	77	77	74	23	58
			Ballabhgarh	Nathu Colony	74	64	74	11	14
			Bhiwani	HB Colony	62	58	24	18	62
			Dharuhera	Municipal Corporation Office	63	50	61	13	63
			Faridabad	Sector-30	98	98	19	14	41
				Sector-16 A	165	-	48	-	165
			Fatehabad	Huda Sector	64	59	45	10	64
			Gurugram	NISE Gwal Pahari	67	67	50	12	35
				Sector-51	118	85	58	19	118
				Teri Gram	85	59	56	-	85
				Vikas Sadan	121	-	51	27	121
			Hisar	Urban Estate-II	70	70	46	24	28
			Jind	Police Line	64	51	50	19	64
			Kaithal	Rishi Nagar	50	50	35	29	22
			Karnal	Sector-12	54	-	54	10	34
			Kurukshetra	Sector-7	56	40	33	14	56
			Mandikhera	General Hospital	64	64	33	-	40
			Manesar	Sector-2 IMT	73	73	25	2	-
			Narnaul	Shastri Nagar	53	53	34	-	14
			Palwal	Shyam Nagar	115	115	94	8	14
			Panchkula	Sector-6	25	-	25	22	24

State/UT	Confirmed COVID-19 cases	Air Quality status (PM10, PM2.5, NO_2 and ozone) ($\mu g/m^3$)							
		AQI range	City	CAAQMS location	AQI	PM10	PM2.5	NO_2	Ozone
			Panipat	Sector-18	91	91	41	70	46
			Rohtak	M D Univ.	49	-	49	-	27
			Sirsa	F Block	69	69	37	6	24
			Sonepat	Murthal	83	83	32	35	15
			Yamunanagar	Govindpura	81	58	44	20	81
Karnataka	408	31-60	Bengaluru	BTM Layout	50	32	-	17	36
				Bapuji Nagar	51	31	18	9	51
				Hebbal	31	31	18	3	-
				Jaya Nagar	34	29	24	26	34
				Peenya	60	-	60	8	-
				Saneguravahalli	38	38	-	24	-
				Silk Board	35	32	23	6	35
			Bagalkot	Vidayagiri	53	38	-	5	53
			Chikkaballapur	Chikkaballapur rural	45	33	18	16	45
			Chikmagalur	Kalyan Nagar	52	52	35	25	28
			Mysuru	Hebbal Ist stage	52	35	24	13	52
			Ramanagara	Vijay Nagar	39	39	30	15	9
Kerala	408	33-60	Ernakulam	Kacherypady	60	23	16	-	-
			Kannur	Thavakkara	59	53	59	18	14
			Kochi	Vyttila	52	27	28	6	2
			Kolam	Polayathode	47	37	47	13	5
			Kozhikode	Palayam	42	41	42	10	9
			Thiruvananthapuram	Kanavattorm	55	39	37	14	55
				Plammoodu	33	27	12	8	28
Madhya Pradesh	1,485	45-169	Bhopal	TT Nagar	109	109	68	12	104
			Damoh	Shrivastav Colony	45	-	45	19	-
			Dewas	Bhopal Chouraha	110	101	110	22	74
			Gwalior	City Centre	95	44	24	11	95
				Phool Bagh	72	-	72	-	-
			Indore	Chhoti Gwaltoli	100	100	78	61	37
			Jabalpur	Marhatal	104	104	55	27	64
			Katni	Gole Bazar	123	123	62	20	94
			Maihar	Sahilara	64	64	30	43	-

State/UT	Confirmed COVID-19 cases	Air Quality status (PM10, PM2.5, NO_2 and ozone) (µg/m^3)							
		AQI range	City	CAAQMS location	AQI	PM10	PM2.5	NO_2	Ozone
			Mandideep	Sector-D Ind. Area	59	59	58	16	25
			Pithampur	Sector-2 Ind. Area	116	116	78	14	16
			Singrauli	Vindhyachal	169	151	99	33	169
			Ujjain	Mahakaleshwar	159	114	159	16	150
Mizoram	1	24	Aizawl	Sikulpuikawn	24	24	-	1	12
Jharkhand	46	93	Jorapokhar	Tata Stadium	93	93	39	14	-
Assam	35	35	Guwahati	Railway Colony	35	35	33	8	32
Odisha	74	99	Brajarajnagar	GM Office	99	99	95	-	-
Maharashtra	4,666	44-89	Aurangabad	More Chowk Waluj	52	38	33	17	52
			Chandrapur	Chandrapur	65	65	49	16	24
				Khutala	85	34	36	19	85
			Mumbai	Bandra	55	55	27	5	-
				Chhatrapati Shivaji Int. Airport	60	60	-	7	-
				Colaba	44	-	26	3	44
				Kurla	76	76	-	20	18
				Powai	78	62	29	3	26
				Sion	89	89	50	18	34
				Worli	52	52	30	5	28
			Nasik	Gangapur Road	56	41	39	26	56
			Navi Mumbai	Mahape	87	87	42	30	42
				Nerul	70	69	44	13	28
			Pune	Karve Road	50	35	37	11	20
			Solapur	Solapur	44	44	42	-	36
Punjab	245	30-96	Amritsar	Golden Temple	43	40	17	17	43
			Bathinda	Hardev Nagar	96	32	11	23	-
			Jalandhar	Civil Line	36	36	35	11	18
			Khanna	Kalal Majra	33	33	25	8	20
			Ludhiana	Punjab Agri. Univ.	35	25	22	20	35
			Mandi Gobindgarh	RIMT University	96	32	11	23	96
			Patiala	Model Town	37	37	24	8	17
			Rupnagar	Ratanpura	30	30	24	16	-
Rajasthan	1,576	57-82	Alwar	Moti Doongri	66	39	35	43	66
			Ajmer	Civil Line	77	51	31	11	77

State/UT	Confirmed COVID-19 cases	Air Quality status (PM10, PM2.5, NO_2 and ozone) ($\mu g/m^3$)							
		AQI range	City	CAAQMS location	AQI	PM10	PM2.5	NO_2	Ozone
			Bhiwadi	RIICO Ind. Area-III	74	74	55	15	55
			Jaipur	Adarsh Nagar	82	30	22	15	82
				Police Commissionerate	68	58	43	22	68
				Shastri Nagar	70	28	22	19	70
			Jodhpur	Collectorate	79	79	52	27	53
			Kota	Shrinathpuram	57	38	34	17	57
			Pali	Indira Colony Vistar	76	76	51	15	75
			Udaipur	Ashok Nagar	81	55	44	15	81
Tamil Nadu	1,520	26-68	Chennai	Alandur Bus Depot	26	-	16	2	26
				Manali Village	68	-	16	8	68
				Manali	40	-	37	9	-
				Velachery Res Area	40	-	5	2	30
Telangana	873	41-60	Hyderabad	Bollaram Ind. Area	53	53	42	39	28
				Central Univ.	45	35	22	45	5
				ICRISAT	41	41	30	22	20
				IDA Pashamylaram	50	46	35	50	24
				Sanathnagar	49	-	48	12	49
				Zoo Park	60	-	60	54	19
Uttar Pradesh	1,184	55-161	Agra	Sanjay Palace	114	-	114	64	11
			Bulandshahar	Yamunapuram	161	161	137	29	117
			Ghaziabad	Indirapuram	89	89	57	25	82
				Loni	123	123	90	16	82
				Sanjay Nagar	109	109	95	44	60
				Vasundhara	89	89	67	51	22
			Greater Noida	Knowledge Park III	113	113	82	-	92
				Knowledge Park V	102	102	-	26	90
			Hapur	Anand Vihar	159	159	83	74	2
			Kanpur	Nehru Nagar	62	-	50	13	62
			Lucknow	Central School	114	-	114	9	11
				Gomti Nagar	74	-	74	24	59
				Lal Bagh	55	-	43	22	18
				Talkatora District Centre	67	-	67	9	-

State/UT	Confirmed COVID-19 cases	Air Quality status (PM10, PM2.5, NO_2 and ozone) (μg/m³)							
		AQI range	City	CAAQMS location	AQI	PM10	PM2.5	NO_2	Ozone
			Meerut	Ganga Nagar	92	92	48	24	28
				Pallavpuram Phase II	113	113	60	16	18
			Muzaffarnagar	New Mandi	103	103	67	7	19
			Noida	Sector 62	89	72	89	17	65
				Sector 1	104	104	55	19	83
				Sector 116	77	-	77	23	46
West Bengal	392	21-69	Howrah	Belur Math	21	21	14	20	-
				Ghusuri	58	42	27	18	56
				Padmapukur	28	27	28	13	13
			Kolkata	Ballygunge	52	27	13	6	52
				Bidhan Nagar	48	25	20	7	48
				Fort William	55	26	23	14	55
				Jadavpur	27	27	16	11	20
				Ravindra Bharti Univ.	69	25	20	25	69
				Rabindra Sarobar	48	21	-	8	48
				Victoria	41	31	18	16	41
			Siliguri	Ward 32 Babupara	38	32	38	38	22

The above data of current air quality vs. confirmed COVID-19 cases in India do not show any clear relationship. However, long-term exposure of higher levels of air pollutants, particularly higher PM2.5 levels, may weaken the immunity and thus raise the risk of COVID-19 infection. A detailed study in this regard is needed.

However, as per present study, **the levels of NO_2 and ozone throughout India were found within the National Ambient Air Quality Standards**, notified as per the CPCB notification in the Gazette of India, dated 18th November, 2009 (PM10 std. 24 hourly = 100 μg/m³, PM2.5 std. 24 hourly = 60 μg/m³, NO_2 std. 24 hourly = 80 μg/m³ and ozone std. 1 hourly = 180 μg/m³).

The levels of PM10 and PM2.5 have significantly declined during lockdown period as compared to normal days. However, levels of PM10 and PM2.5 in some States/UTs at few locations were found above the standards.

Although, at present, we have observed clean air due to the lockdown in India, this respite is only for a short-term period. After the restrictions are lifted and human activities start, there will be a sudden rise in air pollution. But, the lockdown during COVID-19 has shown ways to tackle air pollution issues; only what is needed is political will, societal interventions and strict enforcement.

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Number of Cases Linked to Population Density in India

KK AGGARWAL*, SANCHITA SHARMA†

Density of population has a direct association with the number of coronavirus disease (COVID-19) positive cases. The chances of infection spreading are greater in densely populated areas. But, a place can have dense population, yet people can isolate, work remotely and practice social distancing. Density of population becomes a risk factor for spread of infection where people live in close confined spaces and therefore are in close contact with one another. Social distancing becomes more difficult or practically impossible in such places.

In India, in states with average population density of 1,185/sq km, the average number of cases was 2,048. In comparison, in states with population density of 909/sq km, the number of cases was 34.6.

"Cruise ships are examples of dense mixing of many persons in a confined space over a relatively long period. The density of the group of people on board the COVID-19-infected Diamond Princess, quarantined in Yokohama earlier this year, was estimated around four times higher than that in Wuhan, as was also the R_0 before the onset of countermeasures" (*J Travel Med. 2020 Mar 29*).

The 40-day lockdown was extended for 2 weeks till 17th May. The districts were categorized into Red (hotspot), Green and Orange zones based on their risk profiling.

Green zones refer to districts with either zero confirmed cases till date; or, no confirmed case in the last 21 days, while districts are in red zones depending on the total number of active cases, doubling rate of confirmed cases, extent of testing and surveillance feedback from the districts.

All metros and major cities in the country have been placed in the red zone (hotspots).

Population density according to the 2011 census of India:

Red Zones

- Delhi: 11,312/sq km
- Kolkata: 24,252/sq km
- Chennai: 26,903/sq km
- Mumbai: 20,482/sq km
- Hyderabad: 10,477/sq km
- Indore: 25,170/sq km
- Lucknow: 1,815/sq km
- Surat: 14,000/sq km
- Ahmedabad: 12,000/sq km
- Jaipur: 6,500/sq km
- Chandigarh: 9252/sq km

Green Zones

- Goa: 394/sq km
- Arunachal Pradesh: 17/sq km
- Manipur: 122/sq km

Thirty out of 33 districts in Assam are in the green zone; no red zone. The population density in Assam is 397/sq km. Puducherry has a population density of 2,547/sq km; three out of 4 districts are green zones; there is no red zone.

*President, CMAAO and HCFI; Past National President, IMA
†Editor, IJCP Group

Number of Cases Linked to Population Density in India: Migrant Decongestion is the Answer

State	Cases	Deaths	Density/sq km
Arunachal Pradesh	1	0	17
Mizoram	1	0	52
Manipur	2	0	122
Tripura	2	0	350
Goa	7	0	394
Puducherry	8	0	2,598
Meghalaya	12	1	132
Ladakh	22	0	2.8
Andaman and Nicobar Islands	33	0	46
Chhattisgarh	38	0	189
Himachal Pradesh	40	1	123
Assam	42	1	397
Uttarakhand	55	0	189
Chandigarh	56	0	9,252
Jharkhand	107	3	414
Odisha	128	1	269
Haryana	310	3	573
Punjab	357	19	550
Bihar	403	2	1,102
Kerala	496	4	859
Karnataka	557	21	319
Jammu and Kashmir	581	8	124
West Bengal	758	22	1,029
Telangana	1,012	26	312
Andhra Pradesh	1,403	31	308
Tamil Nadu	2,162	27	555
Uttar Pradesh	2,203	39	828
Rajasthan	2,438	51	201
Madhya Pradesh	2,660	130	236
Delhi	3,439	56	11,297
Gujarat	4,082	197	308
Maharashtra	9,915	432	365

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Safe Handling and Disposal of Personal Protective Equipment and Home Masks

KK AGGARWAL*, ANIL KUMAR†, MONICA VASUDEV

The Requirement of PPEs

To protect health workers from the coronavirus disease (COVID-19), suitable personal protective equipment (PPE) is required, which includes goggles, face-shield, mask, gloves, coverall/gowns (with or without aprons), head cover and shoe cover. Coverall/gowns are meant to protect the torso from exposure to the virus.

The coverall should be impermeable to blood, body fluids, etc. India needs such overalls in large numbers.

According to the World Health Organization (WHO) Disease Commodity Package (Version 4.0) guidelines, the fabric that clears/passes **'Synthetic Blood Penetration Resistance Test' (ISO 16603)** and the coverall that passes **'Resistance to penetration by biologically contaminated solid particles'** (ISO 22612:2005), may be considered as the standard to manufacture coveralls. ASTM F 1670/F-1670M-08(2014) may be used to test synthetic blood penetration.

Disposal of PPEs, Masks, etc.

In India, the safe handling and disposal of PPEs, masks, etc. are covered under Bio-Medical Waste Management Rules, 2016.

Exercising the powers given by Section 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), and in supersession of the Bio-Medical Waste (Management and Handling) Rules, 1998 and further amendments made thereof, the **Central Government vide G.S.R. 343(E) dated 28th March 2016 published the Bio-medical Waste Management Rules, 2016.** The rules are applicable to all those who generate, collect, receive, store, transport, treat, dispose or handle bio-medical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, AYUSH hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research labs.

The **prescribed authority to enforce** the provisions of these rules with regard to the healthcare facilities in any State/Union Territory is the respective **State Pollution Control Board (SPCB)/Pollution Control Committee (PCC)** and in case of healthcare establishments of the Armed Forces under the Ministry of Defence is the Director-General, Armed Forces Medical Services (DGAFMS). These rules lay down the duties of the Occupier or Operator of a Common Bio-medical Waste Treatment Facility as well as the identified Authorities. **Every occupier or operator handling bio-medical waste, irrespective of the quantity, has to obtain authorization from the respective prescribed authority** i.e., SPCB and PCC. These rules comprise of four schedules and five forms. These Rules were further amended in the year 2018 and 2019.

As per **Guidelines** for Handling, Treatment and Disposal of Waste Generated during Treatment/Diagnosis/ Quarantine of COVID-19 Patients – Revision 2 **dated 18/04/2020** issued by Central Pollution Control Board (CPCB), **with regard to COVID-19 Isolation wards** (where COVID-19 positive patients are being kept for treatment/diagnosis), the following steps are needed to ensure safe handling and disposal of PPEs, used masks, head cover/cap, shoecover, disposable linen gown, non-plastic or semi-plastic coverall:

- Used PPEs including goggles, face-shield, splash-proof apron, plastic coverall, hazmat suit, nitrile gloves to be collected in red bag;
- Used masks (including triple-layer mask, N95 mask, etc.), head cover/cap, shoe-cover, disposable linen gown, non-plastic or semi-plastic coverall to be collected in yellow bags.

These Red bags and Yellow bags must be treated and disposed of as per Part 1 of Schedule I of Bio-medical Waste Management Rules, 2016 as amended to date.

*President, CMAAO and HCFI; Past National President, IMA
†Director, HCFI

However, as per CPCB **Guidelines**-Revision 2 **dated 18/04/2020**, used masks and gloves generated **from home quarantine or other households** have to be kept in a paper bag for at least 72 hours before disposing of the same as general waste. Cutting the masks prior to disposal is advised to prevent reuse.

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Is Daily Emollient Necessary for Infants in Prevention of Eczema?

Skin barrier dysfunction can lead to eczema development. A study was done to test whether the daily use of emollient in the first year of children can prevent eczema in high-risk children.

A multicenter, rational, parallel-group, randomized controlled trial in 12 hospitals and 4 primary care sites across the UK was conducted. Families of children were approached via antenatal or postnatal services for enrollment of term infants of at least 37 weeks' gestation. Those infants were included who were at high risk of developing eczema, for example at least one first-degree relative with reported eczema, allergic rhinitis or asthma, or diagnosed by a doctor.

The term newborns with a family history of atopic disease were randomly allocated (1:1) to application of emollient daily for the 1st year with standard skin-care instruction for the emollient group and standard skin-care instruction only for the control group.

The primary outcome was eczema at age 2 years with analysis. Overall, 1394 newborns were randomly assigned to study groups from November 2014 to November 2016; 693 newborns were assigned to the emollient group and 701 to the control group.

Almost 88% (466 of 532) adherence was seen in the emollient group at 3 months, 82% (427 of 519) at 6 months and 74% (375 of 506) at 12 months. At the age of 2 years, eczema was seen in 139 (23%) of 598 infants in the emollient group and 150 (25%) of 612 infants in the control group.

At the end of the study, no evidence was found that daily emollient during the first year of life prevents eczema in high-risk children. The study has concluded that families with eczema, asthma or allergic rhinitis should avoid using daily emollients to prevent eczema in their newborn babies.

Source: Chalmers JR, et al. Lancet. 2020;395(10228):962-72.

Events in Normal Skin Promote Early-life Atopic Dermatitis

Nonlesional skin in atopic dermatitis (AD) is abnormal; however, the pathobiology of lesional and nonlesional skin and the definition of endotypes are not clearly understood.

A study was therefore conducted to define lesional and nonlesional endotypes of AD by building an early life prospective cohort of children with AD, called the Mechanisms of Progression from AD to Asthma in Children (MPAACH) cohort.

In this study, investigators evaluated lesional and nonlesional skin transepidermal water loss (TEWL), filaggrin (*FLG*) and alarmin (*S100A8, S100A9*) expression, staphylococcal colonization and patterns of aeroallergen and food sensitization in order to define the nonlesional and lesional phenotypes and endotypes.

There were pathophysiologic changes in lesional and nonlesional skin and were found to be associated with SCORing Atopic Dermatitis (SCORAD). Nonlesional skin had characteristics of diseased skin, such as low *FLG* and high alarmin expression and heightened *Staphylococcus aureus* colonization. According to a multivariate model, nonlesional and not lesional, *FLG* expression was tied to the development of co-sensitization and moderate-to-severe AD. Lesional skin revealed further deficits in *FLG* expression, but alarmin expression was the same as in nonlesional skin.

Events in the nonlesional skin were thus shown to promote the development of AD severity and co-sensitization. The evidence thus points to the presence of a subclinical eczema endotype that may predispose to the development of allergic disease in the absence of overt eczema.

Source: Biagini Myers JM, et al. J Allergy Clin Immunol Pract. 2020 Apr 14.

Every citizen of India should have the right to accessible, affordable, quality and safe heart care irrespective of his/her economical background

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"No one should die of heart disease just because he/she cannot afford it"

About Sameer Malik Heart Care Foundation Fund

"Sameer Malik Heart Care Foundation Fund" it is an initiative of the Heart Care Foundation of India created with an objective to cater to the heart care needs of people.

Objectives

- Assist heart patients belonging to economically weaker sections of the society in getting affordable and quality treatment.
- Raise awareness about the fundamental right of individuals to medical treatment irrespective of their religion or economical background.
- Sensitize the central and state government about the need for a National Cardiovascular Disease Control Program.
- Encourage and involve key stakeholders such as other NGOs, private institutions and individual to help reduce the number of deaths due to heart disease in the country.
- To promote heart care research in India.
- To promote and train hands-only CPR.

Activities of the Fund

Financial Assistance

Financial assistance is given to eligible non emergent heart patients. Apart from its own resources, the fund raises money through donations, aid from individuals, organizations, professional bodies, associations and other philanthropic organizations, etc.

After the sanction of grant, the fund members facilitate the patient in getting his/her heart intervention done at state of art heart hospitals in Delhi NCR like Medanta – The Medicity, National Heart Institute, All India Institute of Medical Sciences (AIIMS), RML Hospital, GB Pant Hospital, Jaipur Golden Hospital, etc. The money is transferred directly to the concerned hospital where surgery is to be done.

Drug Subsidy

The HCFI Fund has tied up with Helpline Pharmacy in Delhi to facilitate patients with medicines at highly discounted rates (up to 50%) post surgery.

The HCFI Fund has also tied up for providing up to 50% discount on imaging (CT, MR, CT angiography, etc.)

Who is Eligible?

All heart patients who need pacemakers, valve replacement, bypass surgery, surgery for congenital heart diseases, etc. are eligible to apply for assistance from the Fund. The Application form can be downloaded from the website of the Fund. http://heartcarefoundationfund.heartcarefoundation.org and submitted in the HCFI Fund office.

Important Notes

- The patient must be a citizen of India with valid Voter ID Card/ Aadhaar Card/Driving License.
- The patient must be needy and underprivileged, to be assessed by Fund Committee.
- The HCFI Fund reserves the right to accept/reject any application for financial assistance without assigning any reasons thereof.
- The review of applications may take 4-6 weeks.
- All applications are judged on merit by a Medical Advisory Board who meet every Tuesday and decide on the acceptance/rejection of applications.
- The HCFI Fund is not responsible for failure of treatment/death of patient during or after the treatment has been rendered to the patient at designated hospitals.
- The HCFI Fund reserves the right to advise/direct the beneficiary to the designated hospital for the treatment.
- The financial assistance granted will be given directly to the treating hospital/medical center.
- The HCFI Fund has the right to print/publish/webcast/web post details of the patient including photos, and other details. (Under taking needs to be given to the HCFI Fund to publish the medical details so that more people can be benefitted).
- The HCFI Fund does not provide assistance for any emergent heart interventions.

Check List of Documents to be Submitted with Application Form

- Passport size photo of the patient and the family
- A copy of medical records
- Identity proof with proof of residence
- Income proof (preferably given by SDM)
- BPL Card (If Card holder)
- Details of financial assistance taken/applied from other sources (Prime Minister's Relief Fund, National Illness Assistance Fund Ministry of Health Govt of India, Rotary Relief Fund, Delhi Arogya Kosh, Delhi Arogya Nidhi), etc., if anyone.

Free Diagnostic Facility

The Fund has installed the latest State-of-the-Art 3 D Color Doppler EPIQ 7C Philips at E – 219, Greater Kailash, Part 1, New Delhi.
This machine is used to screen children and adult patients for any heart disease.

Free Education and Employment Facility

HCFI has tied up with a leading educational institution and an export house in Delhi NCR to adopt and to provide free education and employment opportunities to needy heart patients post surgery. Girls and women will be preferred.

Laboratory Subsidy

HCFI has also tied up with leading laboratories in Delhi to give up to 50% discounts on all pathological lab tests.

Help Us to Save Lives

The Foundation seeks support, donations and contributions from individuals, organizations and establishments both private and governmental in its endeavor to reduce the number of deaths due to heart disease in the country. All donations made towards the Heart Care Foundation Fund are exempted from tax under Section 80 G of the IT Act (1961) within India. The Fund is also eligible for overseas donations under FCRA Registration (Reg. No 231650979). The objectives and activities of the trust are charitable within the meaning of 2 (15) of the IT Act 1961.

Donate Now...

About Heart Care Foundation of India

Heart Care Foundation of India was founded in 1986 as a National Charitable Trust with the basic objective of creating awareness about all aspects of health for people from all walks of life incorporating all pathies using low-cost infotainment modules under one roof.

HCFI is the only NGO in the country on whose community-based health awareness events, the Government of India has released two commemorative national stamps (Rs 1 in 1991 on Run For The Heart and Rs 6.50 in 1993 on Heart Care Festival- First Perfect Health Mela). In February 2012, Government of Rajasthan also released one Cancellation stamp for organizing the first mega health camp at Ajmer.

Objectives

- Preventive Health Care Education
- Perfect Health Mela
- Providing Financial Support for Heart Care Interventions
- Reversal of Sudden Cardiac Death Through CPR-10 Training Workshops
- Research in Heart Care

Heart Care Foundation Blood Donation Camps

The Heart Care Foundation organizes regular blood donation camps. The blood collected is used for patients undergoing heart surgeries in various institutions across Delhi.

Committee Members

Chief Patron

Raghu Kataria

Entrepreneur

President

Dr KK Aggarwal

Padma Shri, Dr BC Roy National & DST National Science Communication Awardee

Governing Council Members

Sumi Malik
Vivek Kumar
Karna Chopra
Dr Veena Aggarwal
Veena Jaju
Naina Aggarwal
Nilesh Aggarwal
H M Bangur

Advisors

Mukul Rohtagi
Ashok Chakradhar

Executive Council Members

Deep Malik
Geeta Anand
Dr Uday Kakroo
Harish Malik
Aarti Upadhyay
Raj Kumar Daga
Shalin Kataria
Anisha Kataria
Vishnu Sureka
Rishab Soni

This Fund is dedicated to the memory of **Sameer Malik** who was an unfortunate victim of sudden cardiac death at a young age.

- HCFI has associated with Shree Cement Ltd. for newspaper and outdoor publicity campaign
- HCFI also provides Free ambulance services for adopted heart patients
- HCFI has also tied up with Manav Ashray to provide free/highly subsidized accommodation to heart patients & their families visiting Delhi for treatment.

Indian Journal of Clinical Practice, Vol. 30, No. 12, May 2020

CMAAO Weekly Update and Consensus Statement on COVID-19

Minutes of Virtual Meeting of CMAAO NMAs

25TH APRIL, 2020, SATURDAY (9.30 AM-10 AM)

Key Points

- Many Asian countries are coping well and are in a better position than the western countries like the US, UK and European countries.
- Some countries like Malaysia, Singapore are facing some outburst of cases due to foreign workers.
- CMAAO countries are working very hard to contain the spread of coronavirus disease (COVID-19). The mortality is lower in Asian countries.
- Lockdown seems to be a common phenomenon among the CMAAO countries.
- All countries are in different stages of COVID-19 infection.
- It is still not clear what will be the course of the pandemic in the next 2-3 months.
- The situation is evolving very rapidly.
- The virus is here to stay; it will come back in waves. We must prepare for post-lockdown situation.
- Precautions (personal lockdown) should continue for at least 2 years.
- Preoperative testing, which also includes COVID-19 in addition to human immunodeficiency virus (HIV), hepatitis B and C, will become a norm.
- Airborne infection isolation (AII) rooms must be introduced in hospitals; if not possible, then rooms must have air purifiers with high efficiency particulate air (HEPA) filters and exchange rate of 12 per hour.
- Social distancing will be the new norm, even for doctors. Plan for social distancing in offices.
- Airlines will not be fully operational for at least 2 years; may resume travel to lowest risk areas, and monitor it further.

MALAYSIA UPDATE

- On 24.4.20, Malaysia had 88 cases; total active cases are 1932; 363 (64%) patients have been treated and discharged. At present, total cases reported are 5,691.
- The third phase of the movement control order (MCO) has been extended.
- The government has launched an app "MySejahtera" meaning "My Wellbeing"; details about your health can be put in the app and there is a symptom checker, which will give results and tell you if you are at risk. We can also check the area we are in (Red, Yellow or Green zone) based on our location.
- The government is rolling out a return to work policy. It is planning to roll out reverse transcription-polymerase chain reaction (RT-PCR) test for the first 1,00,000 workers in the next couple of days followed by antibody testing for surveillance of those returning to work.
- The exit strategy for MCO will be rolled out slowly.
- Malaysia has a sizeable migrant worker population, which is an area of concern. There might be clusters.

SINGAPORE UPDATE

- There has been an explosion of cases in migrant workers, but we still have a very low death rate. One of the reasons for this is that migrants are mostly under 30 years of age. Local data shows that if you are under 30, only half (0.5%) will need oxygen; the remaining 99.5% are just lying in bed;

we test them, if they are negative then they go home. So, fortunately the disease is very mild in our migrant population.

- Migrant population have been moved out of their dormitories and put in temporary isolation centers. Only about 10% rooms are infected i.e., there are clusters within the dorms (the whole dorm is not affected).
- The lockdown has been extended to the 1st of June.
- The lockdown has started to some effects; there are less and less community cases.
- In future, the pandemic will come back in waves.
- Singapore is facing both 2nd and 3rd waves together. 2nd wave due to people returning back, especially from the UK; the 3rd wave is the migrant population.
- Run your own local tests. Singapore used antibody tests that came from China, which had 90-99% sensitivity and specificity, but our local tests showed that it was only 30%.

INDIA UPDATE

- We are more or less keeping the rate of growth of infection under control. The doubling time has improved to 6.5 days from 3.5 days.
- The increase is only linear; there is no exponential increase in the number of cases.
- Because of shortage of personal protective equipment (PPE) kits, we have started manufacturing (good standard) them locally.
- The situation varies from state to state. Every district has been divided into 3 zones - red, orange and green, depending upon the number of COVID-positive cases.
- Antiviral drugs are being tried as treatment; convalescent plasma therapy has been successful in at least 1 patient.
- Vaccine trials are going on at Indian Council of Medical Research (ICMR) level and the National Institute of Virology (NIV), Pune.
- The lockdown is complete; we are slowly trying to release the lockdown for economic and social reasons.
- Preoperative test for COVID-19 should be routine for all surgeries, even elective procedures. This has medicolegal and safety concerns.
- Decontamination of clinics is a viable option.
- The quality of kits is very important. Kits from China have also failed in India.
- The Government of India has brought in an ordinance to amend the Epidemic Diseases Act, 1897 incorporating stringent provisions against people who commit violence against doctors, nurses and paramedical workers. Attacks on doctors, paramedic staff have been made non-bailable offences punishable with up to 7 years imprisonment. We hope that the government will extend this law even when there is no epidemic and we will have this as a regular law.

AUSTRALIA UPDATE

- There are very good reports from Australia.
- Australia is in the midst of stage 3 lockdown. New Zealand is in stage 4 lockdown.
- The lockdown in Australia could be lifted in 3 weeks, in a gradual manner. Schools will restart.

JAPAN UPDATE

- We are now improving but it is still not controlled, since there are few patients with serious illness.
- We have tried to prepare ICU into a full negative pressure room to reduce the use of PPE.

HONG KONG UPDATE

- The number of confirmed cases has been less than 10 each day. This number has been nil for the last 2 days now.
- We have practiced absolute quarantine for those coming back to Hong Kong; moving them to hotels designated for quarantine. There is no contact between people coming back from overseas and the local people.
- People have been using face masks voluntarily. We have advised them to not touch face even though wearing a mask; this is a loophole for getting the infection.
- We have kept our confirmed cases to 1036, but this is not the time to be complacent. Next month, there is a possibility that the border between Hong Kong and mainland China may reopen. We are on our guard.
- Schools are still closed; university entrance examinations started on 24.4.20. Few students had high fever and left the examination room. This has introduced loopholes in the disease transmission.

Participants

Member NMAs

- Dr KK Aggarwal, President-CMAAO
- Dr Yeh Woei Chong, Singapore Chair-CMAAO
- Dr Rajan Sharma, National President-IMA
- Dr RV Asokan, Honorary Secretary General-IMA
- Dr Marthanda Pillai, Member-World Medical Association
- Dr Ravi Naidu, Past President-CMAAO, Malaysia
- Dr N Ganabaskaran, President-Malaysian Medical Association
- Dr Thirunavukarasu Rajoo, Hon. General Secretary-Malaysian Medical Association
- Dr Alvin Yee-Shing Chan, Hong Kong
- Dr Marie Uzawa Urabe, Japan
- Dr M Namazi Ibrahim, Malaysia

Invitees

- Dr Russell D'Souza, UNESCO Chair in Bioethics, Australia
- Dr KK Kalra, Former CEO-NABH, Director-HCFI
- Dr Sanchita Sharma, Editor-IJCP Group

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Post Lockdown Surveillance

A surveillance initiative was implemented in Shenzhen, China, to isolate and contact trace people suspected of having the COVID-19 coronavirus. This resulted in faster confirmation of new cases and reduced the window of time during which people were infectious in the community. This potentially decreased the number of new infections arising from each case, revealed a study of patients and contacts over 4 weeks (*Lancet Infect Dis.* 2020 Apr 27.)

Viral Shedding Continues up to 6 Weeks After Coronavirus Symptom Onset

Patients may continue to shed the severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) virus for up to 6 weeks after symptom onset, suggested a small study of recovered COVID-19 patients. In the convalescence period, a trace of virus may still be detected; however, similar to other virus infections, this does not suggest transmission ability of the infected individual. As reported in *Clinical Infectious Diseases*, 299 reverse transcription-polymerase chain reaction (RT-PCR) assays were performed (about 5 tests per patient). The longest duration between symptom onset and an RT-PCR test was 42 days, while the median duration was 24 days. Over the first 3 weeks following symptom onset, the majority of RT-PCR results were positive for SARS-CoV-2. From Week 3 onward, negative results increased. All tests were negative at Week 6 after symptom onset. The rate of positive results was found to be the highest at Week 1 (100%), followed by 89.3%, 66.1%, 32.1%, 5.4% and 0% at Weeks 2, 3, 4, 5 and 6, respectively.

What is the Risk Factors for Prolonged Shedding?

Patients with longer viral shedding have been noted to be older and more likely to have comorbidities such as diabetes and hypertension.

From a public health perspective, experts state that there is a need to emphasize that the public should not be scared by those seemingly prolonged positive cases. It is much harder to prove 'no transmission ability' than 'potentially transmissible'.

What Does 14 Days Isolation Means?

People must understand that a 14-day isolation is appropriate for seeing if one will go on to develop symptoms after a known exposure to an infected person. Fourteen days is not a sufficient amount of time to be infected, recover and then be virus free.

Indian Journal of Clinical Practice, Vol. 30, No. 12, May 2020

CMAAO Weekly Update and Consensus Statement on COVID-19

Minutes of Virtual Meeting of CMAAO NMAs

18TH APRIL, 2020, SATURDAY (9.30 AM-10.30 AM)

Key Points

- We must have a clear post-lockdown plan for all healthcare facilities.
- There is a shortage of supply of personal protective equipment (PPE) kits to protect healthcare workers from coronavirus disease (COVID-19); many small clinics have shut down because of lack of appropriate PPE. This shortage is expected to persist because COVID-19 is not going away for another 2 years; there is, therefore, the need to be prepared. We do not know how the situation will unfold.
- In this scenario, PPEs will become a norm, which will also necessitate their continuous supply. Wearing of gloves, shoes, cap and goggles will become mandatory.
- We need to resume working. So, we need to have feasible alternatives to them now, especially for small clinics. One way to address the shortage is to know how we can safely and effectively recycle them. For instance, you can use rubber bands to make the surgical mask more seal-proof or wear double surgical masks if no N95 masks available. One can wear a surgical mask or a cloth mask over a N95 mask to prolong its life. Simple motorcycle visors can be a very useful and economical alternative. A simple surgical mask can be used under this. It can be easily sanitized.
- Another major challenge is violence against doctors. There has been a surge of incidents of violence against doctors in India.
- There are different viewpoints on accepting PPEs as gift from any source. In our last meeting, the consensus was that if doctors are seeking PPEs in the form of donation from any source, it should not be considered unethical under respective councils in the time of a public health crisis.
- Patient autonomy along with their privacy and confidentiality can be curtailed during this crisis for the greater good.

INDIAN MEDICAL ASSOCIATION UPDATE

- India too is facing a shortage of PPE kits.
- Use of motorcycle visors, as an alternative to the PPE shortage, has been implemented in the state of Haryana. You can wear it with a simple surgical mask. It will protect from droplets.
- The government has approved 50 fabric factories to produce PPEs (impervious to water and blood) as per specifications (thickness, etc.) laid down by the Government and Defence Research and Development Organisation (DRDO) and after following all protocols.
- Guidelines and norms need to be defined about the use of PPEs i.e., which to be used where.
- Indian Medical Association (IMA) has shortlisted all the vendors and will soon share the list. The entire PPE kit will be available to private OPDs; costs have come down (₹ 350-450/-) and will be delivered at doorstep. They are found to be safe for routine use. These kits are not the same as HazMat suits. For the seriously ill COVID patients and in ICUs, the original PPE kits are to be used.
- There are now sanitizers (like fumigators) available for single or two doctors' clinics.
- Lockdown must be lifted in a phased manner, depending on the local environment.
- Fear must be overcome and resume work.
- We must have a clear post-lockdown plan. Preparedness, regular use of PPE, personal hygiene

including hand hygiene, behavioral changes and full cooperation of the public will be instrumental to defeat COVID-19.

- Protect our limited resources.
- There will be a surge in psychiatric problems; financial health of every healthcare establishment is very important.
- Violence against doctors must be stopped. It is demoralizing.

HONG KONG MEDICAL ASSOCIATION UPDATE

In Hong Kong, for the past week there have been only 1 to 4 daily new confirmed cases of COVID-19; almost all were imported, as students returned from UK and other citizens returned from USA and Europe. The total number of confirmed cases remains just about 1,000. And no one got infected in the hospital setting but one elderly patient. We had no cases due to contact with people from mainland China with the border theoretically closed. We do not have massive outbreaks as all local or foreign residents in Hong Kong are used to universal masking, frequent hand washing and use of alcohol-based sanitizers now, with awareness of social distancing.

Stay home advice had been there with closed schools and nurseries, close down of many businesses involving personal interaction like beauty centers (except Doctor-run medical beauty clinics), sports centers, bars and gyms, etc. But hairdressings, shops, cinemas and restaurants are still open. Rules limit social gathering in public to less than 4. Penalty tickets had been issued, only occasionally. The hospital manpower and beds are stressed but occupation is basically for isolation, convalescence and not so many are in ICU. High demand for quarantine is persistent though hopefully shrinking if drop of new case confirmation continues. Elective surgeries or services have reduced. No outbreaks so far in expatriate community, domestic helpers staying with the employer families.

SINGAPORE MEDICAL ASSOCIATION UPDATE

- Singapore had 5,050 cases yesterday, mostly in foreign migrant workers (3,500). They are housed in 43 dormitories; some have around 20,000 people in them. We are trying to separate them and finding them alternate accommodation. These migrant workers are fairly asymptomatic and so are not consuming much resources.
- Community cases have reduced to 20 to 30 in a day. The ICUs are not overwhelmed; there are 22 critically ill patients.
- Singapore did well till mid-March; the number of cases rose as people returned home.
- We are stepping up testing. Now we are doing more than 3,000 tests per day.
- Singapore does have some community spread discovered through our routine Flu Surveillance Network.

JAPAN MEDICAL ASSOCIATION UPDATE

- The government has been asked to produce more PPE to address their shortage.
- Many doctors are reusing the N95 masks very carefully.
- University of Osaka is using 3D printer technology to produce face screens for the protection of healthcare workers.
- Clinics are using gowns made from garbage bags, if they cannot get PPE.
- Japan is using an App to identify and contain the clusters.

MALAYSIA MEDICAL ASSOCIATION UPDATE

- Malaysia is doing well with total of 5,255 cases; there have been 86 deaths; 2,900 have recovered; 601 foreigners have tested positive. There were 69 new cases yesterday (17.4.20).
- The movement control order (MCO) will end on April 28.
- We must be prepared for the next 2 years and assess the availability of PPE kits for the future.
- There is a shortage of PPE for healthcare workers, especially in the private sector. General practitioners (GPs), particularly those older than 50, have closed down their clinics.
- Initially there was lot of shortage. But now, the shortage is being eased down.
- The Malaysia Medical Association (MMA) is trying to source materials or whatever we need for the protection of GPs, through a cooperative under MMA. GPs pick up the supplies as and when they come in.
- Doctors are using the 3-ply surgical mask; N95 not available. Sanitizers are in short supply. But gloves are available. Face shields and gowns are available.

But shoe covers and head covers are not so easily available.

- Many industries have been allowed to open. All workers returning to work are being tested (using the coronavirus antibody rapid test) before they enter.

Participants

Member NMAs

- Dr KK Aggarwal, President-CMAAO
- Dr Yeh Woei Chong, Singapore Chair-CMAAO
- Dr Rajan Sharma, National President-IMA
- Dr RV Asokan, HSG-IMA
- Dr Ravi Naidu, Past President-CMAAO, Malaysia
- Dr N Ganabaskaran, President-Malaysian Medical Association
- Dr Yee Shing Chan, Treasurer-CMAAO
- Dr Alvin Yee-Shing Chan, Hong Kong
- Dr Marie Uzawa Urabe, Japan
- Dr Marthanda Pillai, Council Member-WMA

Invitees

- Dr Russell D'Souza, UNESCO Chair in Bioethics, Australia
- Dr KK Kalra, Former CEO-NABH, Director-HCFI
- Dr Sanchita Sharma, Editor-IJCP Group

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COVID Formulas Revisited

Documented polymerase chain reaction (PCR)-positive COVID-19 cases are just the tip of the iceberg.

- In US, 5.7% of people in that tip have died.
- How much iceberg is under the water?

Steamroller COVID: There were roughly two undocumented cases of COVID-19 for each documented case in a paper from Iceland. This implies that a ton of people are still susceptible to the disease. No herd immunity is developing, and the mortality rate is high and that we're going to be stuck inside for a long time.

However, of late, using antibody tests, researchers are sampling asymptomatic people to figure out who had the disease. In early April, researchers from Germany published a study, which found that 70 out of 500 people tested in a hard-hit area had coronavirus antibodies. That amounts to 14%. Translating that to the entire population puts the ratio of undocumented to documented COVID-19 at about 5 to 1.

A much criticized California seroprevalence study involving 3,300 individuals noted that 50 were positive, amounting to merely 1.5%, but in an area that hadn't seen many symptomatic cases, putting the undocumented-to-documented ratio at 85 to 1.

Windstorm COVID: Governor Andrew Cuomo reported that sampling of New York City grocery store shoppers (perhaps not the most random sample) exhibited a seroprevalence rate of about 20%. This translates to an undocumented-to-documented ratio of 10 to 1. This scenario allows us to open up more quickly, assuming that antibodies are protective.

So which COVID is it?

Antibody tests: No test is perfect. The false positives are particularly high. Consider that you have an antibody test that is 98% specific. This means that only 2 out of 100 people will go on to have a false-positive. It will be estimated that 2% of the population has had the disease. If that is done in a random sample of America, you'd estimate that there have been 6 million coronavirus infections, compared with the roughly 1 million we've detected, thus allowing you to cut the death rate down by a factor of 6. However, that result was just due to random chance. A 95% specific test would conclude that at least 15 million Americans have already had exposure, allowing you to take the observed death rate of 5.7% and reduce it to a much more comfortable 0.3%.

Indian Journal of Clinical Practice, Vol. 30, No. 12, May 2020

CMAAO Weekly Update and Consensus Statement on COVID-19

Minutes of Virtual Meeting of CMAAO NMAs

11TH APRIL, 2020, SATURDAY (9.30 AM-10.30 AM)

Key Points

There is a need to look after doctors and all healthcare professionals. Their safety cannot be compromised upon.

Every patient should be presumed to be COVID-19-positive unless tested negative. Take universal precautions.

There is a shortage of personal protective equipment (PPE); public-sector undertakings (PSUs), pharma or non-pharma industry or anybody who wants to contribute should support the healthcare workers in this regard. These are extraordinary times. Hence, it would not be unethical to accept such help nor should there be any conflict of interest in this. These are lifesaving measures. Announcing compensation for families of doctors, nurses and others in both public and private sectors who lose their lives in caring for COVID patients is not enough, instead resources must be made available to protect the frontline healthcare workers.

Reporting any death from severe acute respiratory infection (SARI) or unexplained death should be mandatory. Post-mortem CT chest can be done for all patients brought in dead to find evidence of bilateral pneumonia.

Hospitals and clinics should remain open, instead of quarantining or sealing them if a COVID-positive patient comes to the hospital. The concerned departments or premises should be closed down for 1 day for fumigation (if COVID patient attends a non-COVID designated clinic).

SINGAPORE MODEL

Singapore is facing a second wave of infection; 63,000 citizens/permanent residents returned to Singapore (since mid-March, up to *1,200 citizens come back daily from US and UK. Half of these patients coming back from London had COVID-19)*. Singapore also has outbreak of 511 cases in foreign worker dormitories, which house huge numbers of workers; one of the dorms has 20,000 workers; 5 of these dorms are under lockdown.

There is new data coming out where the mean incubation period is 4 days and median serial interval is 4 days. Serial interval is the time interval between cases in a chain of transmission. This means there is presymptomatic transmission. The viral load is highest for the first 1 to 3 days of symptoms, starts decreasing till the 8th day and then peters out.

Hence, the need to wear masks, practice social distancing, hand hygiene and enforcing the 1 month-long lockdown period (all non-essential services and activities, including schools, closed since April 7). But, in Singapore, lockdown is called as "circuit breaker". Since 25th March, all persons arriving in Singapore are not allowed to go home to their families, instead they are sent straight to a hotel for 14-day quarantine.

Cleaning and disinfection of contaminated surfaces is mandatory and clinic is closed for as long as necessary for this. The doctor is interviewed by the ministry. If wearing the right PPE, then he can carry on working. It also depends on how long the patient was in the clinic.

MALAYSIA MODEL

- Malaysia has 4,346 positive cases; there have been 70 deaths, 1,830 have been discharged and 69 patients are receiving intensive care.
- Malaysia is in a state of lockdown "Movement control order (MCO)" since March 18. This period has been extended up to the end of April in view of the rising number of new coronavirus cases. Those found breaking the MCO are fined up to 1,000 ringgit.

- There is a shortage of PPE for healthcare professionals.
- The pandemic has affected several businesses, including general practitioners (GPs), especially those manned by doctors aged 60 or older.
- If a COVID patient has visited a clinic, the clinic, including the doctor and staff, is quarantined for 14 days and the clinic disinfected by Ministry of Health (MOH) team.

HONG KONG MODEL

- The pandemic seems to be easing. The latest total number of cases is ~1,000. The number of new cases in a day has come down to 16 and we hope that this number comes down to 10.
- Stringent screening at airport and rules on limiting gathering in public and quarantine at home and at airports. There is a fine for breaking rules.
- One doctor has been found to be infected. But, the infection was not acquired in a hospital setting. There is zero mortality among doctors.
- The virus is silent in many "carriers"; relieving many cities from lockdown may be a big risk. But, there are financial implications to an extended lockdown causing huge difficulties not only on businesses in general but also for the private sector of medical services. All private clinics and hospitals had lost most income but still had expenditures and have to strive for survival.

INDIA MODEL

- India is currently in lockdown till 14th April; the Union Government is meeting Chief Ministers of all states to decide whether to extend the lockdown.
- Containment zones and hotspots have been identified and sealed in an effort to contain clusters accompanied by strict monitoring.
- Three parameters are important: Isolation/ quarantine, respiratory etiquettes, personal hygiene; it is important to understand the seriousness of the situation.
- Testing has increased, so the number of cases has also increased.
- There is need for knowledge sharing and proactive working; adequate quality PPE.
- Quarantining a clinic or healthcare establishment gives it a stigma; hence, after appropriate cleaning process, the hospital should be ready to function again, instead of being quarantined for 14 days. The government of Gujarat has decided to close departments for 1-2 days, but not the entire hospitals in such an event.

JAPAN MODEL

- One hundred fifty-three healthcare workers have the infection (30 cases are not from hospitals).
- Infection is more common in age group 20-50 years.
- Although there is "state of emergency", but no hard lockdown; public has been asked to avoid the "3Cs": Closed space, Crowded places and Close contacts to prevent the spread of infections.

Participants

Member NMAs

- Dr KK Aggarwal, President-CMAAO
- Dr Yeh Woei Chong, Singapore, Chair-CMAAO
- Dr Rajan Sharma, National President-IMA
- Dr RV Asokan, Honorary Secretary General-IMA
- Dr Ravi Naidu, Past President-CMAAO, Malaysia
- Dr Alvin Yee-shing Chan, Hong Kong, Treasurer-CMAAO
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- Dr Sanchita Sharma, Editor-IJCP Group

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Indian Journal of Clinical Practice, Vol. 30, No. 12, May 2020

Future Pandemic-friendly Infrastructure

Minutes of Round Table Virtual Meeting

25TH APRIL, 2020, SATURDAY (12-1.00 PM)

EXCERPTS

- Past pandemics and especially present coronavirus disease (COVID-19) infection around the globe and in our country, have given us an opportunity to think about future protection from similar attacks and build systems which are safer, resilient and adaptable.
- As COVID-19 infection is going to persist for some time, may be 2 years or so, even after the lockdown is lifted in phased manner, we need to start afresh with a new way of working in our workplace, hospitals or homes to maintain social distance and hygiene measures for personal protection including that of our neighbors.
- **Discussion points:** How to maintain social distance in lifts, clinics, hospitals, factories, public transport systems, airports, etc.; appropriate ventilation systems at homes, workplace and hospitals, high risk areas to stop transmission of microorganisms including viruses; impact of "no touch" technology and its utility in cost-effective way; use of infection-resistant materials like wall paints, door knobs, handles, etc., and decontamination ease.

Following infrastructure-related concerns were highlighted by the experts after deliberations:

- Most importantly, after an episode is over, complacency sets in at all stakeholder levels and lessons learnt are forgotten to safeguard future calamities.
- Ventilation is a double-edged sword; if not appropriate, it is rather counterproductive and becomes a den for colonization and enhance transmission of disease agent.
- Space management.
- Nonutilization of technology and poor design of the building like green building concepts, natural ventilation and lighting.
- High-cost of establishment and operative costs.

Broad solutions suggested are:

- Building designs should be evidence-based designs (EBD) and there should be meticulous planning to incorporate Green concepts, use of natural resources like lighting and ventilation, resilient and adaptable for expansion and contraction of services in time of crisis (need-based) as makeshift arrangement.

  To cut down cost, in place of single rooms, have Nightingale wards having large windows for lighting and ventilation, maintaining distance between beds minimum 1 meter and curtains for privacy. Common hygienic toilets to be there.

  For this purpose, provision to be made in parking areas, lobbies and other space within or near the premises to raise modular structures in minimum time.

  Use of auditoriums, convention halls, sports auditoriums, etc., to turn them into temporary isolation/quarantine/triage facilities/primary care/monitoring areas like Wuhan erected 13 temporary hospitals in such places in hours to a week's time creating 18,000 beds with zoning and ventilation. Minimum standards for quality and safety were implemented in these makeshift arrangements also.
- To reduce overcrowding in OPDs -
  - Provision for large area in OPD to maintain physical distance
  - Appointment system
  - Teleconsultation/Video consultation room.
- Triage/screening area for prioritization of patients, less than 3 minutes for screening to minimize chances of contact transmission.
- Separate walkway for movement/transfer of infected patients from non-infected patients.
- Separate corridor and lift for healthcare workers; 2-4 patients per lift.
- To reduce transmission by contact: use of sensors for doors, washbasin taps and flush system in toilets/urinals.

- Use of copper alloy (minimum 63%) as bacterial resistance material in door knobs/handles/railings, etc.
- Sufficient facilities for hand wash/sanitizers in clinical areas.
- Sufficient airborne infection isolation (AII) rooms with negative pressure [CDC suggests 1.7 rooms per 10,000 population in mild epidemic; 6.56 rooms per 10,000 population in moderate epidemic severity and 61.5 rooms per 10,000 population in severe epidemic].

VENTILATION: INVOLVES 4 STEPS

1. Pressurization
2. Air changes per hour
3. Filtration
4. Purification of exhaust air

Ventilation systems should follow standards laid down by ASHRAE or other recognized national standards for installation and operations and maintenance. First three processes result in trapping and colonization with microorganisms, purification of these is most essential and generally, this step is not taken care of adequately resulting in the transmission of infection through heating, ventilation and air conditioning (HVAC) system.

Proper temperature and relative humidity as per need of clinical area is important for the comfort of staff/patient as well as deterrent for infecting agents.

Various methods for purification like HEPA filtration, ultraviolet germicidal irradiation (UVGI) or ionization can be used in combination.

Direction of air flow is also a concern.

Provision for switching of type of pressure from positive to negative in rooms or ICU on need basis can be made.

Preventive and regular maintenance as per guidelines.

In any type of setting, varying from a single room clinic to nursing homes to tertiary hospitals, system of adequate ventilation and safe disposal of exhaust air is must and is feasible by using various technologies. The additional cost of installation is going to add cost to establishment but is vital for safety of staff and patients and communities.

PUBLIC TRANSPORT

- Decongestion at airports, stations and bus stops is the need of the hour.
- Sitting norms in airplanes, trains or buses shall change.
- Use of bicycle or two-wheelers to be encouraged.
- **Minimum Quality standards should be made mandatory for all types of health facilities.**
- **Standards to include social distancing norms and infection prevention and control measures.**
- Meeting ended with a vote of thanks to chair and participants. It was decided to hold 2-3 more sessions to discuss technical details.

Participants

- Dr KK Aggarwal, President-CMAAO and HCFI
- Dr AK Agarwal, Ex Dean-MAMC, Advisor-Apollo Hospital, Delhi
- Dr Mahesh Verma, VC IP University, Ex Director-MAIDS, Govt. of Delhi
- Dr Suneela Garg, Dir Prof-MAMC, National President-Elect - IAPSM
- Dr Atul M Kochar, CEO-NABH
- Dr TS Jain, Consultant Pediatrician-Max Smart City Hospital, Ex MS
- Dr Bejon Misra, Founder-Patient Safety and Access, Consumer Online Foundation
- Mrs Upasana Arora, Director-Yashoda Hospital
- Dr KK Kalra, Ex CEO-NABH, Director-HCFI
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Subject Experts

- Mr Sarvagya Srivastava, Engineer in Chief (Rtd.), CPWD, Advisor-IP University
- Dr R Chandrashekhar, Chairman-IGBC Green Healthcare Rating, Consultant World Bank, Consultant IUIH (Indo UK Institute of Health), Vice President-RFHHA, Vice President-IBIMA (India BIM Association), Visiting Prof.-London South Bank University, UK; Former Chief Architect-Ministry of Health & Family Welfare, Govt. of India
- Mrs Maninder Kaur, Architect-Yashoda Hospital
- Mr Mohanbir Singh, Architect
- Mr Suresh DN, Project Manager-Max Health Care
- Mr Ashish Rakheja, Managing Partner-AEON Integrated Building Design Consultant, Past President-ISHRAE and ASHRAE India Chapter, Chairman-Technical Committee Indian Green Building Council Specialization Thermal Engineering

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ISHRAE COVID-19 Guidance Document for Air Conditioning and Ventilation

INTRODUCTION

The COVID-19 pandemic, commonly known as CORONA has engulfed the world and India is no exception. The COVID-19 virus belongs to the CORONA family to which SARS and MERS also belong. As the COVID-19 virus is still not fully understood, the behavior of SARS and MERS is considered as a reference to the extent they do not contradict the present observations. The COVID-19 virus affects the respiratory track and starts with symptoms similar to the common flu. This virus is a mutated strain and as of today no vaccine is available.

The COVID-19 infection may result in deteriorating health or a patient's body immunity may resist the infection, but still remain a carrier. Close contact with those who are infected and coughing or sneezing without mask protection can spread the infection. The best prevention as of today is ensuring isolation and distancing from an infected person. The difficult part is the carrier is asymptomatic in the incubation period varying from 7 to 15 days. Most Governments have therefore adopted distancing and isolation to avoid contact by locking down cities and countries to different degrees.

COVID-19 TRANSMISSION ROUTES

The size of a coronavirus particle is in the range of 80-160 nanometers. It is transferred via infected microscopic airborne particles and contaminated aerosol droplets. Droplets and small particles of a broad spectrum of diameters get generated during the course of coughing and sneezing and, to a lesser extent, even by talking and breathing (refer Figure 2, which is indicative).

Most large cough droplets fall on nearby surfaces and objects – such as desks and tables, where they remain

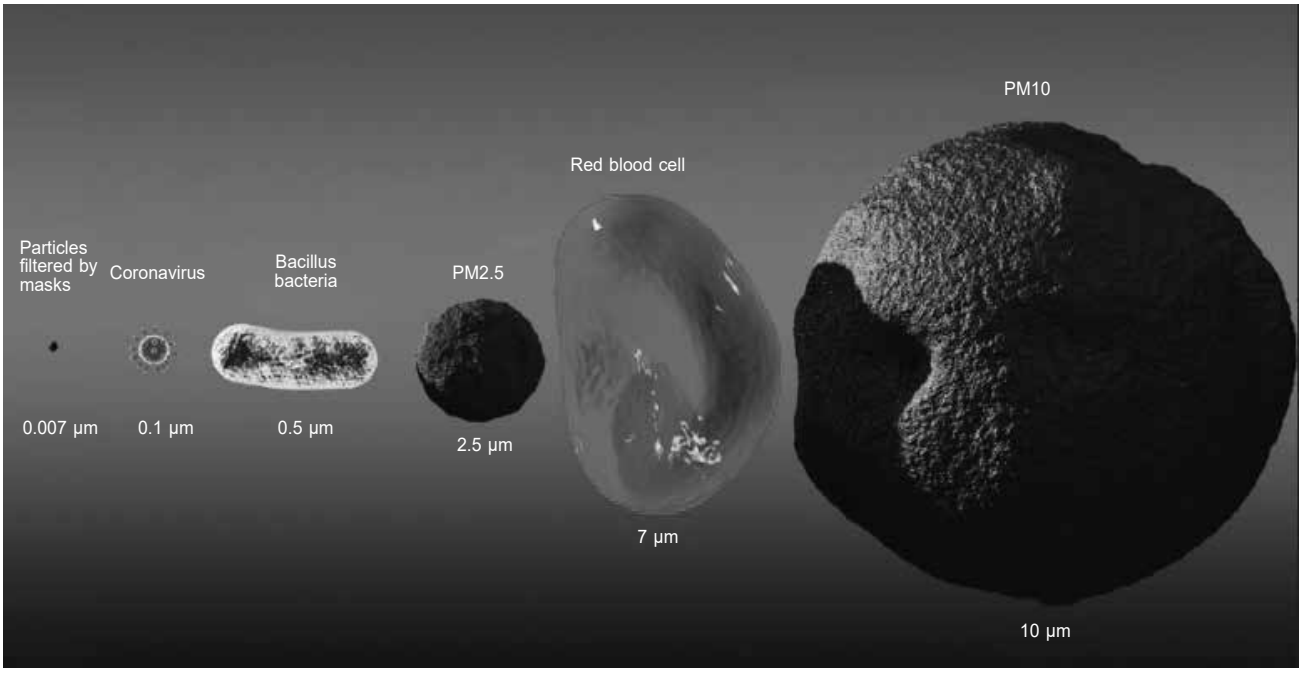


Figure 1. Size of particle.[1]

Source: Central Public Works Department, Govt. of India, dated 22.4.20

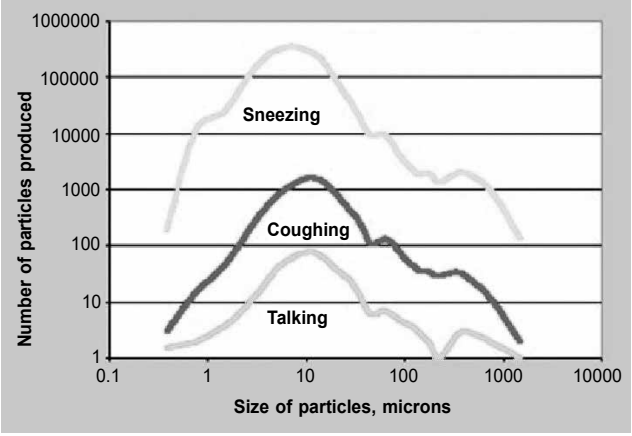


Figure 2. Particles emitted during Talking, Coughing & Sneezing.[2]

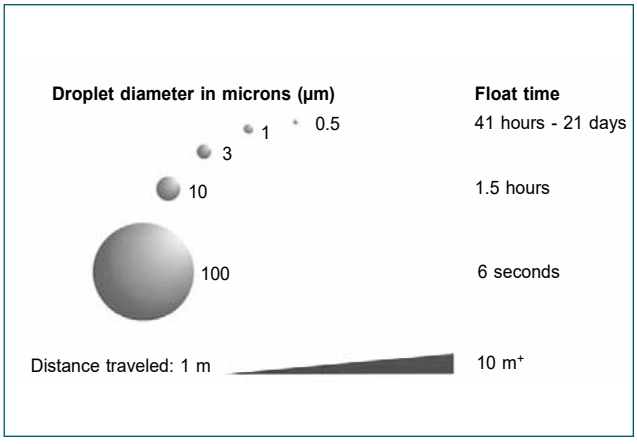


Figure 3. Infectious droplets shrink, travel far and evade surface cleaning when air is dry.[3]

active for hours and even 2-3 days. People can get infected by touching those contaminated surfaces or objects; and then touching their eyes, nose or mouth. If people are standing within 1-2 meter of an infected person, they can be infected by breathing-in droplets sneezed or coughed out or exhaled by them.

Small particles (less than 5 microns) released during cough stay airborne for hours and can be transported over long distances. Small droplet nuclei or residue are formed from droplets (usually within milliseconds) in the air, which shrink in size due to the process of evaporation and desiccation in low humidity.

It is known that most of the infectious particles ranging from 0.65 to 3.3 µm in the cough-generated aerosols were immediately respirable.[4] There is also no reported data or studies to rule out the possibility of the airborne-particle route. One indication for this: Coronavirus SARS-CoV-2 has been isolated from swabs taken from exhaust vents in rooms occupied by infected patients.

Apart from cough generated aerosols, the particulates suspended in the air also represent a substrate for viruses and consequently their transmission through this path.[5] In the indoor environment, one of the sources of dust is atmospheric dust (PM2.5 and PM10) coming in through fresh air intakes. The other prominent source is the dust generated by humans and processes. **Reduction of indoor dust levels is a step towards mitigation of this source of COVID-19 transmission.**

The fecal transmission route for SARS-CoV-2 infections is implicitly recognized by WHO. It is known that flushing toilets are creating plumes in the air containing droplets and droplet residue when toilets are flushed with open lids. **This makes it important that with the use of exhaust fans, toilet air should not come into the other occupied areas.** If toilet seats are equipped with lids, it is recommended to flush the toilets with closed lids in order to minimize the release of droplets and droplet residues from plumes in the air.

Another path for transmission is when virus-laden aerosols are deposited on apparel and on the floor and then get re-suspended into the air due to the movement of people. That is why sanitizing the floors frequently and limiting the movement of people is helpful in curtailing this route of transmission. In healthcare facilities sanitization of apparel is recommended as per protocol.[6]

EFFECT OF ENVIRONMENTAL CONDITIONS

Relative Humidity

Relative humidity is found to affect the infectivity (the ease with which infection can take place) of virus through the respiratory route. The normal human body has excellent protection systems to prevent respiratory infections. There are several layers of filters starting with the mouth and the windpipe. The moist surfaces having mucus layer collect the larger particles before they enter the trachea and pharynx in the upper respiratory tract. In the lower respiratory tract, the bronchi and alveoli can trap smaller particles to various degrees of efficiency.

When we breathe dry air, the mucous membrane in the lungs becomes dry. The fluid over lining the cells becomes more viscous, and the little hairs called cilia, which protect our lungs from deep settling of viable and non-viable particles, cannot work and particles settle more deeply in the lungs. If we consider oxygen and CO_2 transport and the blood, it is only one cell membrane that separates the airspace from the blood. So, if something goes from our lungs into the blood, we get infected.

Moisture in the air is the first arm of our immune system and we now know that our body cannot fight off foreign particles or invaders as adequately as when we're in a dry environment. Further, the infectivity of the bacteria too increases with low humidity. Relative humidity of at least 40% is considered the threshold.[7] Studies indicate that 80% relative humidity and above tends to neutralize the COVID-19 virus.

However, too much humidity leads to higher levels of dust mites and fungi, two of the worst culprits for indoor allergy sufferers. Mold and fungi are known to exacerbate respiratory conditions such as asthma.

All things considered, the relative humidity level of 40%~70% is considered to be the most suitable environment for humans and decreases problems from pathogens.

Temperature

Temperature tends to be a factor that directly affects the comfort of building or hospital occupants. Comfort temperature is generally considered between 24°C and 30°C, after accounting for air velocity, relative humidity and clothing. The study of the transmission of COVID-19 virus in 100 cities of China indicates that high temperature and high humidity significantly reduce the transmission of influenza.[8]

Studies conducted at various RH levels have shown that using viral culture methods, low temperatures (7–8°C) were optimal for airborne influenza survival, with virus survival decreasing progressively at moderate temperatures (20.5–24°C) and further decreases at higher (greater than 30°C) temperatures.[9]

As per some recent studies, SARS-CoV-2 has been found highly stable on surfaces for 14 days at 4°C; one day at 37°C and 30 minutes at 56°C were needed to inactivate the virus.[10]

RESIDENTIAL APPLICATIONS

Residential spaces are cooled by Room Air conditioners, Evaporative Coolers and Fans.

- **Room Air conditioners** control temperature and reduce humidity.
- **Evaporative coolers** are effective in Hot and Dry climates only. They reduce temperature by evaporating water.
- **Fans** provide body comfort by convection and evaporation due to increased air motion.

Room Air Conditioners

Room air conditioners re-circulate air within a single occupied zone. Capacities vary from 1 to 3 TR (Tons of Refrigeration). Installed for a single room application, the entry of occupants into such spaces is controllable.

Recirculation of cool air by room air conditioners, must be accompanied by outdoor air intake through slightly open windows and exhaust by natural exfiltration.

Fresh air intake through a fan filter unit will prevent outdoor dust entry (containing high levels of PM10 and PM2.5 particles) and exhaust through kitchen and toilet exhaust fans kept operational.

Set room temperature between 24°C and 30°C. Maintain relative humidity between 40% and 70%. (In humid climates, set temperature closer to 24°C for dehumidification and in dry climates closer to or at 30°C and use fans to increase air movement).

In dry climates, do not allow relative humidity to fall below 40%. Water evaporating from a pan kept in the room will increase humidity if it falls below 40%.

Evaporative Coolers

Evaporative coolers, often known as **desert coolers,** provide effective cooling in hot and dry climates. A fan draws hot and dry outdoor air over water-saturated pads, causing the water to evaporate and cool the air. Air leaving the Evaporative Cooler, is up to 15°C cooler than outdoor air, is directed inward.

Most evaporative coolers do not have air filters as original equipment, but they can be fitted to the cooler during or after installation. This is advisable to prevent dust entry and maintain hygiene. Evaporative cooler tanks must be kept clean and disinfected and the water drained and refilled frequently.

Horizontal-flow evaporative coolers installed in windows can effectively cool a room or a section of a room.

Windows must be kept open to release humid air. Portable evaporative coolers that do not draw outdoor air are not recommended, since their cooling reduces with humidity rising inside the space.

Evaporative coolers must draw air from outside to ensure good ventilation.

Fans

Fans, such as ceiling and pedestal type, are an inexpensive yet effective method to provide indoor

comfort. They increase body comfort by increasing air motion to dissipate heat by convection and evaporation.

Fans should be operated with windows kept partly open. If an exhaust fan is located at a nearby location then it must be kept running to exhaust air for better ventilation.

COMMERCIAL AND INDUSTRIAL FACILITIES

Commercial establishments and industrial facilities have multiple occupancy as well as transient visitors. It is this aspect that necessitates precaution in operating their air conditioning systems.

For the purpose of Guidance for operation during a pandemic like COVID-19, air conditioning is **categorized** based on the **types of indoor units installed:**

(These indoor units may be connected via refrigerant or chilled water pipes to DX outdoor units, VRF outdoor units or a chiller).

The best action to limit risk of COVID-19 infection by air is to ventilate indoor environments with outdoor air as much as possible. Mechanical ventilation systems and air conditioning systems, which provide ventilation, can perform this function more effectively than simply opening the windows, because they improve the quality of the outdoor air with filtration.

Categories of Indoor Units:

i) **Multiple Cassette Units:** Ceiling mounted units that can each cool up to 50 sqm and can be controlled individually or as a group.

ii) **Multiple Hi Wall Units:** Used due to ease of installation and low cost.

iii) **Tower Units:** For larger spaces, where most occupants are not stationary thus allowing for higher drafts.

iv) **Ducted Units:** A mini central air conditioning system that is easy to operate.

v) **Fan Coil Units:** Installed in guest rooms, individual office spaces or patient wards.

vi) **Air Handling Units:** Can provide better ventilation, filtration and coil disinfecting.

Operating Guidelines for All Categories

A) **Air filters must be kept clean as given in the Section -** Operation and Maintenance.

B) **Provide adequate ventilation** (Fresh Air and Exhaust).

C) **Inspect and clean the indoor unit coils, as given in the Section -** Operation and Maintenance.

D) **Set Room Temperature between 24°C and 30°C.** Maintain relative humidity between 40% and 70%.

(In humid climates set temperature closer to 24°C for dehumidification and in dry climates closer to or at 30°C; Use fans to increase air movement).

E) **Heat Recovery Wheel (HRW):** It is advisable to keep this wheel in off mode to reduce cross contamination. Upon restarting, the wheel must first be sanitized.

F) **Toilet and Kitchen Exhaust Fans** must be kept in operating mode.

Recommendations for Category I), II) and III) Indoor Units:

If fresh air is not provided, it is advisable to introduce a fresh air duct attached to a central inline fan filter unit and distribute the fresh air by grilles into the space or near the indoor units. For Cassette Units, the fresh air duct may be connected to the available port of the Cassette Unit. In case fresh air cannot be provided through a fan it is recommended to actively use operable windows.

A minimum fresh air volume of 3 cum/hour per person and 3.75 cum per hour per sqm (5 cfm per person and 0.6 cfm per sq ft) is recommended.

A separate Treated Fresh Air DX Unit may be provided in the case of a multiple unit installation. This will reduce the impact of reducing available cooling capacity by supplying non treated fresh air.

Recommendations for Category IV), V) and VI) Indoor Units:

Fresh air must be provided by an inlet duct and fan. It is advisable to provide a MERV 13 or higher filter fitted on the Air Handling Unit. If a filter of higher filtering capability is retrofitted into an existing system, care shall be taken to ensure that the fan and motor capacities are adequate to handle the higher pressure drop.

A minimum fresh air volume of 3 cum/hour per person and 3.75 cum per hour per sqm (5 cfm per person and 0.6 cfm per sq ft) must be provided. The recommendation is to maximize supply of outside air within the limits of the system.

In buildings without mechanical ventilation systems it is recommended to actively use operable windows. Add a TFA (treated fresh air) unit if recommended fresh air intake impacts cooling performance. Install

UVGI (Ultraviolet germicidal irradiation) for larger Ducted Units and AHUs to keep coils continuously clean and disinfected. It is advisable to inspect the AHUs and ducts for air tightness and low leakage.

Additional Recommendations for Industrial Facilities

Minimum air changes of around 10-15 ACHP is advised for good ventilation. The mechanical exhaust air shall be 70% to 80% of fresh air quantity to maintain necessary positive pressure in the space.

In cases of evaporative cooling/air washers it is advisable to disinfect the water using UVGI or ionization or chemical dosing. Run the system in fan only mode for 30-60 minutes every day to dry the cooling pads. Then run only the pumps for water circulation without fans in operation for 30 minutes, to wash out any bacterial growth. Finally flush the water from the tanks and re-start the system with fresh water.

In case of re-circulating system, it is recommended to limit return air circulation. The return air system could be converted to an exhaust system.

The same process must be followed in case evaporative cooling is used for a commercial facility.

HEALTHCARE FACILITIES

Converting General Patient Rooms or ICUs into COVID-19 Patient Areas – Considerations Pertaining to HVAC Systems

COVID-19 positive patients and patients with COVID-19 related symptoms are to be accommodated in designated "Airborne Infection Isolation Rooms" in hospitals to control spread of the disease. However due to the surge in the number of such patients, healthcare facilities may not have adequate number of "AII" rooms to accommodate all such patients. Hence, healthcare facilities would need to convert their existing patient rooms or ICUs into COVID-19 patient rooms or COVID-19 ICUs to handle the current pandemic. The most important factor in this scenario is to ensure that the virus laden airborne particles do not leak out of the rooms occupied by COVID-19 patients and also to maintain the concentration of virus laden particles inside the COVID-19 patient room at a minimum. This is required to control the spread of infections and also to protect the healthcare workers.

As it is in normal practice, most of these patient rooms would be served by a HVAC system that would be of a recirculatory type, wherein the air from the room is taken back to the AHU for thermal conditioning and brought back. The same HVAC system could also be connected to a few other areas of the hospital. In some cases, there might be no dedicated return air duct and it could be a ceiling return system. If a COVID-19 patient had to be admitted to such a room, it would present a significant risk of the virus laden particles spreading out from the designated COVID-19 patient rooms.

To convert an existing patient room or ICU into a COVID-19 patient area, it is first necessary to convert the room into a non-recirculatory system (100% once through system).[11,12] On an emergency basis, this can be achieved by blanking (blocking) off the return air vents in the COVID-19 patient room. It is important to make sure that the AHU will have provision to receive adequate outdoor air supply. The outdoor air source for the AHU shall not be from within the building and all care shall be taken to avoid intake of outdoor contaminants, to the best possible extent. Additionally, an independent exhaust blower shall be provided to extract the room air and exhaust out into the atmosphere, preferably, after suitable "exhaust air treatment". The exhaust air quantity shall be greater than the supply air quantity such that a negative pressure of minimum 2.5 Pa (preferably >5 Pa) is achieved in the room. It is advisable to install differential pressure meters to measure this metric. The supply air quantity shall be such that it will provide a minimum of 12 air changes per hour. The position of the extract air in the room shall be just above the head of the patient's bed.[12]

Treatment of Exhaust Air from COVID-19 Patient Areas

The exhaust air is most likely to contain particles carrying a viral load and hence a suitable technique should be deployed to prevent the spread of infections. Treatment of exhaust air can be done preferably by HEPA filtration.[11] (HEPA filters shall be tested and certified for performance in accordance to international standards like IEST, EN, ISO, IS, etc.). These HEPA filters shall be a minimum of H13 (EN1822-1) filter class or equivalent. When not possible, treatment of exhaust air by chemical disinfection is acceptable. When both the methods are not viable, the exhaust air shall be let off into the atmosphere through an upward plume at a height of 3 m above the tallest point of the building, thereby lowering the viral load concentrations to insignificant levels by dilution. This exhaust discharge shall be well away from other air intake points and populated places.

When HEPA filters are used to treat the exhaust air, it is preferable to install them at the primary point of air

extraction in the room and the exhaust blower shall be at the discharge end of the exhaust duct (where applicable).

Chemical disinfection of the exhaust air from COVID-19 patient room can be done by bubbling the exhaust air through a "Diffused air aerator tank" (preferably of non-metallic material) holding a 1% sodium hypochlorite solution.[13-15] The concentration shall be checked on a regular basis and dosing undertaken based on need. The aeration tank shall be placed in an unpopulated outdoor area and not inside enclosed space. Suitable PPE shall be used while handling the hypochlorite solution and direct contact with skin and eyes shall be avoided. The above chemical inactivation procedure for treatment of exhaust air is suggested based on the available information at this time.

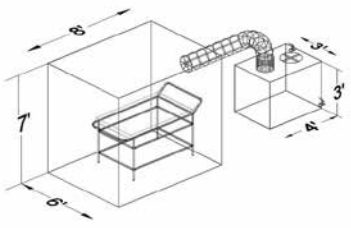
The other two options available for exhaust air treatment being UV irradiation and heating. MER Darnell et al.[16] observed that an exposure time of 45 minutes at a temperature of 75°C resulted in complete inactivation of SARS-CoV. Similarly, an UVC (254 nm wavelength) irradiation with an exposure time of 15 minutes at irradiation intensity of 4016 $\mu W/cm^2$ resulted in complete inactivation of SARS-CoV.

It is to be noted that the exhaust systems could have viral load deposits, some of which may be active. Therefore, suitable personal and environmental protection protocols shall be followed during any maintenance activity on the exhaust system, for personnel protection and to avoid environmental spill. It may be noted that the treatment of exhaust air by HEPA filtration is the preferred method and the other suggested methods may be adopted due to non-availability of HEPA systems.

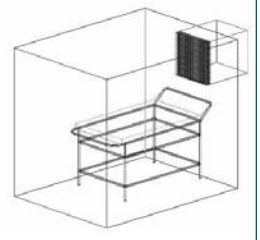
Disinfection of the condensate water from the air conditioning system shall be done as mentioned in the O&M section of this document.

Setting Up Make-shift Isolation Enclosures

In resource constrained healthcare settings, several COVID-19 patients may be required to be admitted to a single large room. This presents a significant risk to the healthcare workers as well as a possibility for environmental spread of virus laden particles. For such instances, a make-shift patient isolation enclosure could provide the necessary protection. This could be a temporary make-shift cubicle or tent constructed out of a skeleton structure (of plastic or metal) and plastic sheet or canvas covering. The tent shall be covered on all sides excepting the front, where PVC strip curtains can be provided. Arrangements for light and a fan inside the tent can be provided for the comfort of the patient, as necessary. The tent shall be provided with an exhaust blower to extract the air inside the enclosure and exhaust out into the atmosphere after suitable treatment. Exhaust air treatment can be done as mentioned earlier. The exhaust blower shall be so sized that a negative pressure of >2.5 Pa is maintained inside the enclosure.[12]



Isolation enclosure with chemical disinfection for exhaust air. (*Dimensions are only indicative*)



Isolation enclosure with HEPA filtration for exhaust air

In case of air-conditioned patient rooms where exhaust blowers cannot be fixed, or in case of patient rooms served by unitary air conditioners, the isolation enclosure can be installed inside the patient room with HEPA filtered exhaust air. The exhaust air, after HEPA filtration, can be discharged inside the room. This provides a localized negative pressure zone inside the room and helps control infection spread and offers protection to the healthcare workers.

Quarantine Areas

Quarantine refers to separation of individuals who are not yet ill, but have been exposed to COVID-19 and therefore have a potential to become ill. Quarantine can happen at home or in quarantine centre, where several such individuals may be under quarantine. In a quarantine situation, it is the physical distancing and avoidance of contact (direct and indirect) transmission that is the key.

A quarantine centre shall be well ventilated and preferably be maintained at a negative or neutral differential pressure. When mechanical ventilation is resorted to, it shall be a once through system (non-recirculatory system) that provides a "clean to dirty" (towards the patient and away to the exhaust) air flow pattern.

PORTABLE ROOM AIR CLEANERS

At the outset, it is important to note that a portable air cleaner will only clean the air that passes through the cleaner. The air cleaner will not be able to protect people from direct (droplets) and indirect (surface

contamination) exposure but can help reduce the indoor concentration of contaminants through the action of dilution. Thus, over a period of time, the air in a space can be cleansed with the right air cleaners.

There are many technologies used in portable air cleaners. With regards to removing virus and bacteria, specifically, technologies vary from passive filtration to active filtration with all sorts of claims. With any active filtration technology, it is important to ensure the single pass efficiency and the possibility of any harmful byproducts that may be released due the active nature of the cleaning. Some of the technologies used are Ionization, Bi-polar ionization, PCO, ESP, ozone generators, etc. The efficacy of some of these is not yet clearly proven and infact some of these technologies may have contraindications. UVGI, if deployed correctly, has proven to be useful in inactivating bio-aerosols.

Passive technologies include HEPA filtration that can remove particles down to 0.1 micrometers or even smaller particles. An H13 certified or equivalent HEPA filter should be able to remove these viruses from the air that passes through the cleaner.

One must be aware of the number of air changes when installing portable air cleaners in a given space. Ideally, one must design air cleaners with about 3-4 air changes per hour. The higher the air changes, the better the efficiency of cleaning. One must be careful when reading the CADR numbers on most commercial products as they will give either the highest number (based on highest fan speed) which will be very noisy or will give the free-flow air handling capacity of the fan motor (i.e. without filters installed), rather than the actual airflow rate (with all filters installed).

Hence, one must analyze the air flow, in cum per hour (or equivalent CFM) of the unit at different speeds and choose the machine with the right air flow, based on room size and fan speed, to ensure proper filtration and comfort, that includes a desired level of quietness.

OPERATION & MAINTENANCE

These recommendations are limited to operation of HVAC systems during the COVID-19 pandemic (excluding COVID-19 areas in healthcare).

Residential applications: The room may be kept well ventilated during the period of non-use of AC with fans running. As an extra precaution, the frequency of service can be increased. It is advisable to clean the indoor unit filters by the end user as per the instruction given in the user manual by the manufacturer. In case there is need to call a technician, it is advisable to call the company authorized technician. Careful evaluation should be done by the customer and the service technician on the nature of breakdown and decide on the repairs location site/workshop. In-case of a major breakdown, it is advisable to request for a replacement machine to have minimum contact time with the technician.

Commercial applications: Most commercial establishments have remained closed during the lockdown. These establishments will need maintenance for both engineering and health safety. The air-conditioned spaces of establishments under prolonged lockdown will pose health hazards due to fungus and molds in the ducts and open spaces depending on the humidity and temperature prevailing within. Further there may be bird droppings, and excreta of rodents as well increased level of insects. The system not be designed for sufficient fresh air intake and ventilation. The following steps are recommended for the start-up of air conditioning system.

1. The user or the owner should get the area sanitized.
2. Study the fresh air and exhaust system adequacy as per the guidelines and inform the user to modify the system if found inadequate.
3. Carry the preventive maintenance on all the units as per manufacturer's guidelines. This should include disinfecting and cleaning of:
    a. Filters, grilles, diffusers and internal surfaces: it is recommended to use 5% Cresol solution (containing 50% Cresol and 50% Liquid soap solution). Mix 1 liter of this solution in 9 liters of water. The surface shall be sprayed with this solution, left for 10 minutes and then washed/ wiped clean with water/cloth. (The above methodology is only for washable filters).
    b. Condensate drain pan: Disinfecting/treatment of condensate drain pan is suggested using UV treatment or 1% sodium hypochlorite dosing. This will apply only if the HVAC equipment is working on a re-circulatory mode.
    c. Coils: Follow standard recommendations of coil cleaning and then sanitize using the same protocol as that of the filters specified above.
4. In case the area has ducted air distribution, it is advisable to clean the ducts by an appropriate method that may include santization.

5. The following process is recommended at start-up:
   a. Open all the doors and windows of the space.
   b. Ensure that all cleaning protocols as advised above are complete.
   c. Run the fresh air system at the maximum intake of air setting.
   d. Start and run the exhaust systems if available.
   e. Start the air conditioning system in fan mode only, without filters and run it for minimum of two to four hours with doors open and exhaust system operational.
   f. Install the clean and sanitized filters.
   g. Start the AC in normal mode and run for two hours with doors open and then close the doors and windows.
6. The fresh air and ventilation system should be kept on throughout the off cycle and on the weekend and holidays in air circulation mode.

GUIDANCE FOR SERVICE TECHNICIANS

The safety of service technicians is paramount. The recommendations are as follows:

Do's

- Carry company identity card, authorized letter (during lockdown).
- Avoid public transport, use personnel vehicle as far as possible. Disinfect the vehicle before and after the visit on daily basis; special attention to be given to the handle, steering, gear rod, hand brake, dashboard, seat, seat belt, etc. The driver if accompanying, should stay inside the vehicle, except for essential health breaks and emergency.
- Check for home quarantine stickers/stamp at the customer's location. Do not enter in case of any such stamp/sticker, and re-schedule the service.
- Maintain social distancing norm and wear a face mask. Avoid personal contact, including handshakes with co-workers/customers.
- Carry your own water bottle and food as required.
- Wash hands often for at least 20 seconds using soap. Always carry alcohol-based sanitizer and use whenever hand washing is not possible.
- Use prescribed PPE (Personal Protection Equipment).
- Carry a sanitary bag of adequate size, to keep the replaced item and dispose safely.
- Follow proper disposal methods for used PPE's (Mask, Gloves, Goggles).
- Monitor your health closely. If you develop symptoms like fever, cough, sore throat, tiredness or shortness of breath, immediately inform the office and take necessary action as advised by the government. Do not continue to work under these circumstances.
- Avoid using of alcohol-based sanitizer, before working with electrical sources.

Don'ts

- Never board unknown persons in the vehicle.
- Never touch the common items provided at the customer place such as newspaper, common towel, etc.
- Never handle other person's belongings or share food and water from others.
- Never use another person's crash helmet or PPE.
- Do not hand over one's mobile phone to another person/colleague.
- Do not share the pen especially for service report signature from customer, instead ask the customer to use their own pen.
- Never enter premises which are marked as isolated or quarantined.

Additional Precautions at Hospitals & Laboratories

Do's

- The tools and tackles should be sanitized before and after every visit including the bag.
- Compulsorily wear surgical nose mask, before entering inside the Hospital, and Laboratory sites. Change the mask every six hours or as soon as it becomes wet.
- All technicians should wear a clean, long-sleeved gown or full body suit, N95 Respirator, gloves, face cover if they need to enter into COVID patient's isolation ward or COVID-19 lab. After exit, dispose the used PPE's into the designated "RED" color bin.
- Carry a disposable bag of adequate size, to keep the removed/replaced item and disinfect them at suitable location in the hospital premises.
- Barricade the area, while rendering the service to avoid trespassing. For rendering the service outside the conditioned zones such as for chillers, outdoor units, fresh air AHUs, cooling towers ensure that

the authorities have cleaned and disinfected before the work is started.

- Maintain complete record of the time spent in the premises.

Don'ts

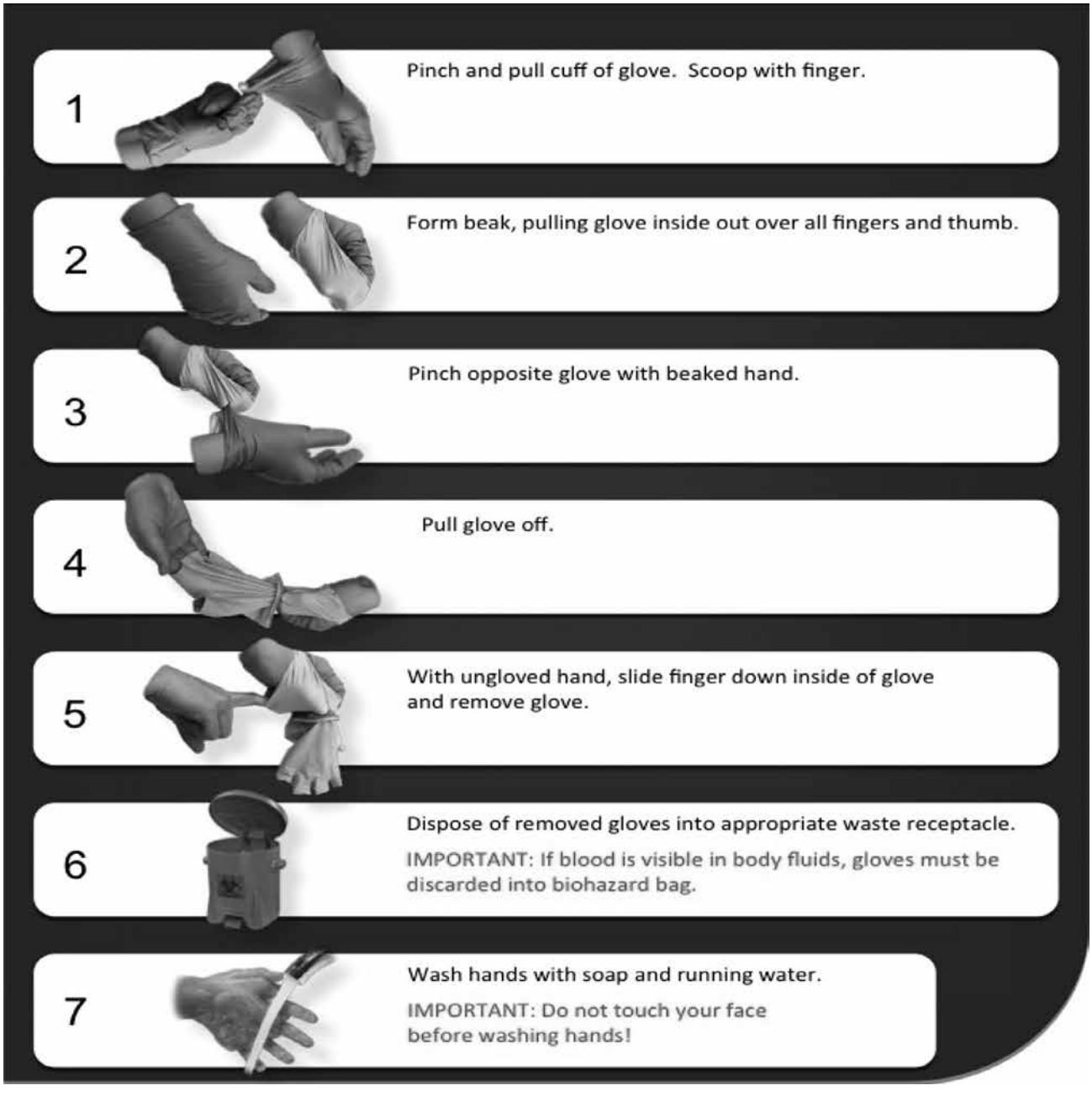
- Come in close contact with the patients and visitors in the hospital site.
- Touch bio-hazardous components such as surgical knife, needles and lab equipments, used cotton and clothes, etc.
- Use handrails, touch objects such as lift buttons, door handles and fixtures with your bare hands.

How to Disinfect Tools & Tackles:

- First, clean the surfaces, removing any contaminants, dust, or debris. You can do this by wiping them with soap water (or a cleaning spray) and a hand towel. Wash towel with soap water.
- Then apply a surface-appropriate disinfectant. The quickest and easiest way to do this is with the following:
  - Disinfecting wipes
  - Disinfectant spray
  - Isopropyl alcohol
  - Hydrogen peroxide.

The Procedure for Use of Mask and Removal of Gloves is Critical as Given below:[17,18]

CONTAMINATED GLOVE REMOVAL



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■■■■

What is the HCW Return Policy?

Dr Robert Quigley, Senior Vice President and Regional Medical Director of International SOS, noted in an email to Reuters Health, "The question that remains is how great does the viral load need to be to infect another person if in fact the viral load actually decreases over time. Regardless, until this virologic feature is defined, it is clear that infected healthcare professionals (HCPs) should have two consecutive negative tests before returning to the healthcare arena where they could potentially infect a fragile patient." (*Medscape*)

Three Drugs Better

Patients hospitalized with COVID-19 receiving a combination therapy with three antivirals, including-protease inhibitor lopinavir-ritonavir, nucleoside analogue ribavirin and injectable interferon beta-1b, exhibited significantly shorter median time to a negative SARS-CoV-2 test compared to controls, revealed a small phase II trial. Median number of days from initiation of study treatment to a negative test result, the trial's primary endpoint, was 7 days compared with 12 days in the control group that only received lopinavir-ritonavir, reported Kwok-Yung Yuen, MD, of the University of Hong Kong, and colleagues writing in *The Lancet*.

Indian Journal of Clinical Practice, Vol. 30, No. 12, May 2020

Round Table on Lockdown Exit Policy

Minutes of Virtual Meeting Organized by IMA in Association with HCFI and CMAAO

11TH APRIL, 2020, SATURDAY (11 AM-1 PM)

Participants

- Dr KK Aggarwal, President-CMAAO
- Dr Rajan Sharma, National President-IMA (On the Chair)
- Dr RV Asokan, Honorary Secretary General-IMA
- Dr AK Agarwal, Ex Dean-MAMC
- Dr Mahesh Verma, VC IP University, Ex Director-MAIDS, Govt. of Delhi
- Dr Suneela Garg, Dir Prof-MAMC, National President-Elect - IAPSM
- Dr Parag Rindani, CEO-Wockhardt Hospital, Mumbai
- Dr Girdhar Gyani, DG-AHPI
- Dr Atul M Kochar, CEO-NABH
- Dr Jugal Kishore, Head-Dept. of PSM, Safdarjung Hospital
- Dr TS Jain, Consultant Pediatrician-Max Smart City Hospital, Ex MS
- Mr Bejon Misra, Founder Patient Safety and Access, Consumer Online Foundation
- Dr Anita Arora, Director Medical Operations-Fortis Healthcare
- Mrs Upasana Arora, Director-Yashoda Hospital
- Dr Arati Verma, VP-Head Quality Max Healthcare
- Dr KK Kalra, Ex CEO-NABH, Director-HCFI
- Dr Sanchita Sharma, Editor-IJCP Group

The following points emerged after the discussion:

- The COVID-19 pandemic is the first outbreak of this nature and scale in our lifetime. We commend the Prime Minister Shri Narendra Modi for taking pre-emptive timely measures to contain the pandemic at the very beginning of the infection in India. Even the World Health Organization (WHO) has acknowledged India's efforts in this regard.
- Today (11.4.20) is the 18th day of the lockdown in India (implemented from 24th March 2020 midnight). It has slowed the spread of the disease vis-à-vis the United States and European countries. But now healthcare workers are being infected and hospitals and healthcare establishments are being put under quarantine/sealing. This is creating a panic-like situation and overcrowding of other already overburdened public healthcare facilities. There is a stigma attached to a quarantined or sealed hospital. Presently, there is a lot of anxiety and fear among healthcare professionals and other staff resulting in the closure of stand-alone clinics and smaller healthcare facilities in the private sector, which are catering to 80% of outpatient care.
- Majority of private hospitals are functioning at 30% capacity resulting in sustainability issues.
- The lockdown cannot be lifted all at once, but it has to be done in a phased manner depending on the number of active cases and other parameters as per containment guidelines. There is no widespread community spread yet; there are clusters of cases and hotspots in various parts of the country. How long will the virus persist in the environment is a question, which cannot be answered at this time by anyone!
- The decision to lift the lockdown is not influenced by medical reasons alone; economical and sociopolitical reasons also to be looked into (lives and livelihood).
- There was a unanimous decision that all healthcare facilities including stand-alone clinic must remain functional at all times regardless of the stage of infection.

- Standard universal precautions and physical distancing must be practiced by all healthcare staff and professionals, regular decontamination of clinics as well as clinical areas of a hospital/nursing home should be done. Indian Medical Association (IMA) shall develop guidelines (Best Practices) for the same and make available to all.
- Hospitals must have a strategy for communication with their patients for follow-up, information spread and to answer queries of the public with the aim to limit the physical visits of patients as far as feasible and to allay anxiety. IMA to develop FAQs based on most common queries raised by the public so as to ensure that a common message is given from all healthcare facilities.
- Adequate quantities of quality personal protective equipment (PPE) should be ensured; the cost of this additional component may be charged as additional surcharge from patients, even in clinics.
- All clinicians to use technology to curtail visits of patients, especially for a minor ailment and chronic patients for follow-up like teleconsultations or video chats on a charge basis since the Medical Council of India (MCI) has already come out with Telemedicine guidelines.
- All healthcare facilities to start system of appointments, triage, separate area for suspected COVID-19 patients or some other mechanism based on prior information sought at appointment time; this should be applicable even in clinics.
- Training of healthcare professionals and support staff is a must to practice best practices as well to allay their anxiety/fear. Various associations like IMA, Heart Care Foundation of India (HCFI) and Association of Healthcare Providers – India (AHPI) should work out a plan for the same for medical fraternity and support staff. Accredited hospitals can take up the responsibility to train smaller healthcare facilities/clinics in their vicinity.
- Counseling services should be made available; IMA is already running a round-the-clock helpline; counseling may be added. This is the need of the hour.
- Adequate, effective security of healthcare facilities and staff to be ensured by the state government.
- Separate hospitals for COVID-19 patients across nations. Rest of hospitals to continue to function as pre-COVID-19 infection time. The non-COVID-19 hospitals should also have a fever screening OPD at a different area away from common areas of patient flow. Suspected cases to be referred and transported to nearby COVID-19 hospitals with full precautions in a safe manner.
- Hospitals should not be sealed or put under quarantine by a state administration; complete decontamination of the organization using fast disinfection technology as being done for operation theaters (OTs) and intensive care unit (ICU) in case of an outbreak should be done and hospital should reopen in a day or two.
- Testing facilities to be increased, for hotspot areas, antibody-antigen kits to be made available. All healthcare workers to be tested for COVID-19 infection.
- A significant proportion of healthcare staff is getting infected as on date resulting in the spread of infection as well as further aggravating the existing shortage of human workforce at healthcare facilities.
- Dr KK Aggarwal suggested a pilot project to study the prevalence of COVID-19 infection among healthcare staff using antigen-antibody test.
- Keeping in view the financial hardships faced by healthcare workers, it was suggested that employer contributions like ESI, PF, etc. to be borne by the state government for at least 3 months or till normalcy in functioning of organizations comes.
- Alleged medical negligence cases also need a different approach from the current approach in present scenario; IMA to give suggestions for medical councils in this context.
- In the present scenario, when there is a shortage of PPE globally, healthcare workers are getting infected, it is totally acceptable to receive quality PPEs from pharma or non-pharma sources or an NGO; this should not be taken as unethical practice in the interest of healthcare functioning and safety of frontline COVID-19 warriors.
- "Pradhan Mantri Garib Kalyan" insurance scheme should be extended to private practitioners also. Presently, it covers health workers engaged in direct contact and care of COVID-19 patients in public facilities or staff deployed from the private sector. NABH has also sent a request letter to the ministry in this regard.

PRIORITIZATION OF CLINICAL SERVICES

Since most of clinics and healthcare establishments are closed, there is a need to restart after a gap with a fresh

mind and attitude and protection. Following is the list of services for priority:

- Doctor should wear an N95/surgical mask and disposable gloves at all times and all PPE as per Infection Prevention and Control (IPC) guidelines of Government. Nurse and support staff also to wear PPE.
- Every patient and surface should be considered as potential COVID-19 positive until proved otherwise and all standards precautions to be taken like PPE, hand hygiene, respiratory etiquette and physical distancing.

VACCINATION FOR PREVENTION OF COMMUNICABLE DISEASES

- Pediatric immunization must go on as per national schedule/pediatric association guidelines.
- Adult vaccination: This is an opportunity to promote adult vaccination, especially for the elderly. Since they are a high-risk category for COVID-19 infection, vaccination against pneumonia, flu should be a must for this group to minimize the severity of COVID-19 symptoms.

CHILDREN

- Minor routine problems can be taken care of on teleconsultation.
- Any alarming symptom observed by parents or fever to be attended in the clinic. After first visit, thorough assessment is done and documented, instructions given to parents when to contact in an emergency, follow-up can be done on Video or Telecall.

Care of pregnant woman and childbirth

Acute medical/trauma emergencies requiring time-sensitive interventions

Care of vulnerable populations, such as young infants and older adults

Continuity of critical inpatient therapies

Care of cancer patients

Dialysis centers

Auxiliary services, such as diagnostic imaging, laboratory services and blood bank services

Supply chain in respect of medicines, devices to be ensured at all levels

For many chronic diseases, follow-up remotely if no new symptom

Patients can monitor their BP, sugar levels, weight and temperature at home

Remote monitoring of Homecare patients using remote mentoring devices

Certain routine elective surgeries can be deferred for some time if not affecting life adversely

KEY CONSENSUS POINTS

- Healthcare services to remain functional; none of healthcare establishments including clinics should be closed regardless of stage of COVID-19 infection.
- This is the right time to adopt the best practices.
- Lockdown should be lifted in a phased manner.
- Medical services/health sector should be the first to resume as clinical care has to continue even for non-COVID-19 patients.
- Presume every patient is potential COVID-19 infected and take all precautions as per uniform protocols.
- Healthcare workers should adopt and practice standard universal precautions at all times not just during the time of COVID-19. Appropriate PPE of good quality should be used as per guidelines.
- All clinics and hospitals to practice and promote hand hygiene, respiratory etiquettes, frequent disinfection of clinical areas.
- Hospitals including stand-alone clinics to follow necessary protocol related to COVID-19 management as prescribed and restrict family/friends/children visiting patients in hospitals.
- Adopt best practices for biomedical waste management.
- Sensitize auxiliary and other support staff at the clinic to build up their morale and confidence.
- Capacity building (training and retraining) of doctors, nurses and support staff including ambulance drivers is mandatory.
- NABH accredited hospitals can be teaching institutes for capacity building of nearby solo establishments.
- Communication with patients and attendants is mandatory to allay fear and anxiety. The exit plan should have enhanced communication between the patient and the doctor for follow-up, answer their queries and give them updated information.

- Mental health issues need redressal. IMA is running a psychological helpline in collaboration with United Nations Population Fund (UNFPA).
- Doctors need to feel safe, with no fear of violence against them.
- The financial sustainability of health institutions is of paramount importance. The private sector may now charge 10% surcharge for additional expenses on account of PPE, disinfectants, etc. Employer contribution in respect of PF and ESI, etc. may be contributed by the state government for 3 months or till normalcy comes.
- Development and sharing of Best Practice guidelines with its members.

Exit Policy Part II

Criteria	Stage III (High vulnerability)	Stage II (Moderate vulnerability)	Stage I (Low vulnerability)
No. of active cases in the past 7 days	Greater than or equal to 20 but less than 50	Less than 20 cases with new cases in the past 7 days	Less than 5 active cases with no new cases in the past 7 days

Stage III and IV are Both Considered Red Zones

Duration of follow-up is 28 days (14=14).

Perimeter around index case or cluster is 3 km (to be reassessed upon number of cases) and buffer zone is 5 km and 7 km in peripheral areas (rural).

Activity	Red	Yellow	Green
Closure of all educational establishments (schools, universities, coaching institutes, etc.), gyms, museums, cultural and social centers, swimming pools, theaters and workplaces. Online education to be promoted. Initially for 28 days, to be reassessed based on risk.	Yes	Yes	No
Possibility of postponing exams may be explored. Ongoing exams to be conducted only after ensuring physical distance of 1 meter amongst students.	Yes	Yes	No
Encourage organizations/employers to allow employees to work from home wherever feasible. Meetings, as far as feasible, shall be done through video conferences.	Yes	Yes	No
All mass gatherings, events and meetings in public or private places in the containment zone and buffer zones shall be cancelled/banned till lockdown is lifted.	Yes	Yes	No
Restaurants, pubs, malls, markets shall remain closed except take away services for food.	Yes	Yes	No
Restaurants to ensure handwashing protocol and proper cleanliness of frequently touched surfaces. Ensure physical distancing (minimum 1 meter) between tables; encourage open air seating where practical with adequate distancing. Similar practices to followed by cinemas, malls and pubs.	Yes	Yes	Yes
Keep already planned weddings to a limited gathering; postpone all non-essential social and cultural gatherings.	Yes	Yes	Yes
Hand hygiene, physical distance between chairs to be maintained, No sofa sets, fabric face mask	Yes	Yes	Yes
Local authorities to have a dialogue with organizers of sporting events and competitions involving large gatherings and they may be advised to postpone such events.	Yes	Yes	Yes, with limit of number of people
Local authorities to have a dialogue with opinion leaders/panchayat and religious leaders to avoid mass gatherings and should ensure no overcrowding/at least 1 meter distance between people. **Use this opportunity for mass awareness and advocacy in community.**	Yes	Yes	No more than 20 Physical distance To be ensured Sanitizer available

Activity	Red	Yellow	Green
Local authorities to have meeting with traders associations and other stakeholders to regulate hours, exhibits.	No	No	Yes
Dos and Don'ts and take up a communication drive in market places like sabzi mandi, anaj mandi, bus depots, railway stations, post-offices, etc., where essential services are provided.	Yes	Yes	Yes
All commercial activities to remain closed except essential commodities and services.	Yes	Yes	Yes
All commercial activities for essential goods and services must keep a distance of 1 meter between customers. Measures to reduce peak hour crowding in markets.	Yes	Yes	Yes
Cancellation of public transport (bus/rail/air); non-essential travel should be avoided.	Yes	Yes	50% Sanitization, Distance between seats to be ensured
Minimum transport facility for healthcare workers (HCWs) should be available around shift times to reach hospitals.			Posters displayed Disinfection of vehicle
Healthcare services to remain functional, HCWs to take standard precautions, use appropriate PPE of good quality as per guidelines. Practice and promote hand hygiene, respiratory etiquettes, disinfection of clinical areas frequently including clinics. Every patient to be seen as potential COVID-19 patient and all precautions to be taken as per uniform protocols. Hospitals including stand-alone clinics to follow necessary protocol related with COVID-19 management as prescribed and restrict family/friends/children visiting patients in hospitals. Training of nurses and support staff. Best practices for biomedical waste management and communication with patients and attendants.	Yes, in all stages		
Agricultural activities	Yes, with precautions regarding hygiene of workers, minimum workers from same locality, training of farmers must		
Special protective measures for delivery men/women working in online ordering services.	Yes	Yes	Yes
Keep communities informed consistently and constantly.	Yes, at all times and stages Community awareness and engagement is essential		
Courts and Judiciary	Hearing of matters of constitutional nature with minimum staff present.	Courts must function normally, but a revision of the timetable should be undertaken to mark and eliminate dates with extra congestion. Procedure for digital hearing should be attempted.	
Identify mechanisms to maintain availability of essential medications, equipment and supplies.	Yes		
Non-medical essential services, food, vegetables, fruits, groceries and milk.	Ensure use of face mask, social distancing		
Electricians, Plumbers, salons, Auto mechanics, Construction workers, home helps *Construction activity can be allowed in unaffected districts provided labor is available locally. No construction activity shall be permitted in affected districts.	Few may be allowed for few hours a day, workers are from locality		

Activity	Red	Yellow	Green
Surveillance	Yes, both active and passive		Yes passive only
Perimeter control and movement of vehicles within the containment zone will be prohibited except for those issued passes for providing essential services as per guidelines/orders from administration.			
Care of Elderly and vulnerable groups like immunocompromised, on dialysis, chemotherapy, chronic neurological disease, etc.	Yes		

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IL-37 Protective in Allergic Contact Dermatitis via Mast Cell Inhibition

Allergic contact dermatitis (ACD) is a T cell-mediated inflammatory condition. It is marked by erythema, vesiculation and pruritus. Mast cells (MCs) have a key role to play in the pathogenesis of ACD.

Interleukin (IL)-37 is known to relieve inflammatory responses in various allergic diseases. A study was designed to determine the immunomodulatory effect of IL-37 on allergic inflammation. Investigators employed a 2,4-dinitrofluorobenzene (DNFB)-induced ACD experimental model and isolated rat peritoneal mast cells (RPMCs). It was noted that systematic application of IL-37 led to a significant relief in ear swelling, reduced inflammatory cell infiltration, diminished inflammatory cytokine production (TNF-α, IL-1β, IFN-γ and IL-13), resulted in the inhibition of MC recruitment, decreased IgE levels and reduced IL-33 production in the local ear tissues with DNFB challenge. With IL-37 intervention, RPMCs obtained from ACD models exhibited downregulation of IL-6, TNF-α, IL-13 and MCP-1 production following IL-33 stimulation. They also exhibited β-hexosaminidase reduction and histamine release under DNP-IgE/HSA treatment.

Treatment with IL-37 significantly restricted the NF-κB activation and P38 phosphorylation in ACD RPMCs. SIS3, a specific Smad3 inhibitor, was shown to abrogate the suppressive effects of IL-37 on MC-mediated allergic inflammation, thus pointing to the involvement of Smad3 in the anti-ACD effect of IL-37.

The study thus revealed that IL-37 has a protective action against IL-33-regulated MC inflammatory responses by inhibiting NF-κB and P38 MAPK activation associated with the regulation of Smad3 in experimental models with ACD.

Source: Li W, et al. Int Immunopharmacol. 2020;83:106476.

A Comparison of Therapeutic Management of Adults with Atopic Dermatitis with Psoriasis and Chronic Urticaria

The management options in AD are based on consensus-based guidelines, also established for psoriasis and chronic urticaria. The treatment approach in AD, particularly in the moderate-to-severe forms of the disease, appears to be less aggressive than in psoriasis and chronic urticaria, with systemic agents used less frequently. A recent study compared the therapeutic management of adults with AD to those with psoriasis and chronic urticaria in real life conditions.

Investigators conducted a transversal analysis in May 2017, using retrospective data from a monocentric database. Data were collected on epidemiology, severity, therapeutic educational intervention and systemic treatments from 401 patients with AD, and were compared with data from 230 patients with chronic urticaria and 535 patients with psoriasis. About 73% of atopic dermatitis patients presented with a moderate-to-severe form of the disease compared to only 39% of chronic urticaria and 17% of psoriasis patients. Nearly 78% of the AD patients had completed a therapeutic educational program. On the contrary, the adherence was found to be lower in chronic urticaria (35%) and in psoriasis (3%) patients. A systemic treatment, including biologicals, was evident in 8% of AD patients, compared to 26% of chronic urticaria and 47% of psoriasis patients. The findings revealed that AD treatment was predominantly based on topical regimens. Only a minority of moderate-to-severe AD patients who are eligible for systemic treatment receive such therapy.

Source: Pascal C, et al. J Eur Acad Dermatol Venereol. 2020 Mar 2.

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Robust Primary Healthcare Really Helps

MEENAKSHI DATTA GHOSH, SUDHANSH MALHOTRA

It is more ethical, for reasons of access and accountability, to promote primary public healthcare over tertiary private systems.

COVID-19 has upended the most developed health systems worldwide, sickened over three million people, and led to over 2,35,000 deaths and still counting. Sudden, frequent and disruptive public health emergencies could be the new normal. The COVID-19 public health emergency could be an opportunity for India to explore how best to build upon our strengths and address our revealed failings.

COVID-19 compels us to candidly confront the following ethical questions in terms of healthcare:

WHERE DO FUNDS GO?

First, should the state outsource to the private sector, its moral responsibility of providing basic and essential healthcare? Even where vulnerable segments are covered by public health insurance, purchasing healthcare services from private hospitals will involve higher lifetime costs to the exchequer (capital and O&M), than if provided directly by the state.

The public primary healthcare system, a vehicle for extending basic and essential healthcare to all of rural India, was unable to deliver on its promise. It remained under-funded, under-supplied and under-staffed. The answer does not lie in abandoning it.

One headline in a national daily says it all: 'Govt system in front, private hospitals do the distancing' leading to the comment: "This is the time that the private sector should be looking at a welfare maximisation model and not a profit-maximisation model. Hopefully, this will happen," from the CEO of Ayushman Bharat.

Second, there is a trade-off between expenditures on public, primary and referral care on one hand, and secondary tertiary healthcare on the other. The greater the investment on the former, the less will be the demand on the latter, and the reverse. The demand-driven profits of privatised secondary and tertiary healthcare, whether or not supported by the public exchequer, will eventually choke fiscal support for public primary healthcare.

This is because a large privatised healthcare sector will be able to pressurise the political class to reduce allocations assigned towards public primary healthcare and instead divert much of these to the privatised healthcare sector. At that point, who will the daily-wager, migrant, slum-dweller, and other vulnerable segments turn to?

Is it not more cost-effective for the government to equip, modernise and strengthen its own assets — the numerous AIIMS already built and waiting to be utilised — at tertiary levels, as well as the continuum of public primary healthcare (HSCs, PHCs and district hospitals) in many States, lying unmanned/abandoned? Get these going. Wherever there remain shortages in human resources or in machinery/equipment, contract in services as required, but do not throw out the baby with the bathwater.

GROUND-LEVEL CARE

Third, is the responsibility for healthcare provision better discharged at State levels or through decentralized, constitutionally elected bodies like the panchayats/ *nagar-palikas* (local government units/LGUs)? A gold-standard example in India is Kerala. Decentralised governance has driven Kerala's extraordinary success over COVID-19. People are not irrational. They trust ground-level public service delivery because they can monitor quality, receive feedback, see the response of authorities to said feedback, and then vote with their

Reproduced from The Hindu - Business Line. Updated on May 06. Available at: https://www.thehindubusinessline.com/opinion/robust-primary-healthcare-really-helps/article31519978.ece?utm_campaign=webwhatsapp_article_share&utm_medium=referral&utm_source=whatsapp.com. Published on May 07, 2020.

feet. These LGUs are our assets, which we are failing to use.

COVID-19 has demonstrated that to reduce overall disease burden as well as healthcare costs on a country-wide basis, there is no alternative to the State providing comprehensive public primary and referral, publicly-funded, secondary and tertiary healthcare. If citizens want a need-based, demand-driven, and people-centric architecture for healthcare, why push it into the hands of private entities when we can easily take the more cost-effective, ethical route?

Expand the scope of public health: The Swachh Bharat Abhiyan (SBA), an excellent primer, remains an unfinished agenda. We need to widen the scope of the SBA to include sewage and effluent treatment powered by solar panels; and in the process, recover valuable materials i.e. organic fertiliser. Organise systemic clearing of landfills (the Indore district provides an outstanding, recent example), ensure that toilets have running water, and routinise waste management. These are best-managed at the LGU levels, not from Delhi or Bengaluru. An expanded SBA will address holistically, the social determinants of health.

More money for health: The absence of resources for the health sector has been a story of malign neglect for over seven decades. An initial assignment of 2.5 per cent of the GDP in the current year should be escalated to roughly 6 per cent within two years. Any increase in allocation ought to be so apportioned that at least 70 per cent is assigned towards the continuum of the preventive and primary care, including referral healthcare up to public tertiary facilities, as opposed to the current practice of assigning over 60 per cent to curative care.

The first port of call: Merging of the health sub-centre and the primary health centre is an excellent initiative, leading to the creation of 1,50,000 Health & Wellness Centres (HWCs), close to the homes of the vulnerable segments. It is critical that these HWCs exercise serious gate-keeping functions. The patient presenting herself at the HWC should, with the exception of medical emergencies, be entitled for further PM-JAY insurance cover for secondary/tertiary care, only when referred by the HWC.

Second, the comprehensive primary healthcare (CHPC) dispensed at the HWCs should become part of the ongoing PM-JAY health insurance package, like in Thailand, for example, where state-funded health insurance famously includes primary healthcare.

Disease Prevention and Control: Planning for disease prevention and control begins with a regular feed of reliable, accurate data. India's National Health Profile 2019 was a grim reminder that we continue to have a 36 per cent communicable-disease burden, of which over 50 per cent deaths were ascribed to pneumonia and acute respiratory diseases (symptoms common with the SARS and COVID-19). That was a wake up call!

There is a new urgency to upgrade health security across the country. Can we not equip the National Centre for Disease Control (NCDC) with a web-based 'computerised infectious diseases reporting' (CIDR) system to build health situational awareness, and early event detection? A CIDR would require all hospitals, medical practitioners and clinical directors of diagnostic laboratories (across the public and private sectors), to notify the Director General, NCDC-Ministry of Health, in respect of specific (infectious/other) diseases, which government will declare as notifiable.

The CIDR will compile every incoming information into a single, shared, national information repository. The epidemiology, disease burden, emerging threats to health and public safety within each district, will be adequately spotted, recorded, and investigated 24/7 in real time.

The NCDC was envisaged to serve as an institution at par with the Centre for Diseases Control and Prevention (CDC) of the US. This may be an appropriate time to make the NCDC an autonomous, apex organisation and restore to public health the stature it never acquired in India.

Ghosh is former Secretary, Ministry of Panchayati Raj, and former Special Secretary, Ministry of Health. Malhotra is former Regional Adviser, World Health Organization, South East Asia.

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Suspension of Rules 8, 9(8) & 18a of the PCPNDT Rules, 1996

KK AGGARWAL*, IRA GUPTA†

The Union Ministry of Health and Family Welfare has vide Notification dated 4th April, 2020 while exercising its powers under Section 32 of the Pre-conception and Pre-natal Diagnostics Techniques (Prevention of Sex Selection) Act, 1994 (PCPNDT Act) has **suspended the implementation of Rule 8, Rule 9(8) and Rule 18A(6) of the Pre-conception and Pre-natal Diagnostics Techniques (Prevention of Sex Selection) Rules, 1994 (PCPNDT Rules) until 30th June, 2020** in view of the emergency situation arisen due to pandemic COVID-19, whereby entire country has been put under lockdown.

This notification is effective retrospectively from the date of the lockdown till 30th June, 2020.

The provisions of Rule 8, Rule 9(8) and Rule 18A(6) of PCPNDT Rules, 1996 are reproduced hereunder:

Rule 8: Renewal of Registration

(1) An Application for renewal of certificate of registration shall be made in duplicate in Form A, to the Appropriate Authority 30 days before the date of expiry of the certificate of registration. Acknowledgment of receipt of such application shall be issued by the Appropriate Authority in the manner specified in sub-rule (2) of rule 4.

(2) The Appropriate Authority shall, after holding an enquiry and after satisfying itself that the applicant has complied with all the requirements of the Act and these rules and having regard to the advice of the Advisory Committee in this behalf, renew the certificate of registration, as specified in Form B, for further period of 5 years from the date of expiry of the certificate of registration earlier granted.

(3) If, after enquiry and after giving an opportunity of being heard to the applicant and having regard to the advice of the Advisory Committee, the Appropriate Authority is satisfied that the applicant has not complied with the requirements of the Act and these rules, it shall, for reasons to be recorded in writing, reject the application for renewal of certificate of registration and communicate such rejection to the applicant as specified in Form C.

(4) The fees payable for renewal of certificate of registration shall be on half of the fees provided in sub-rule (1) of rule 5.

(5) On receipt of the renewed certificate of registration in duplicate or on receipt of communication of rejection of application for renewal, both copies of the earlier certificate of registration shall be surrendered immediately to the Appropriate Authority by the Genetic Counselling Centre, Genetic Laboratory, Genetic Clinic, Ultrasound Clinic and Imaging Centre.

(6) In the event of failure of the Appropriate Authority to renew the certificate of registration or to communicate rejection of application for renewal of registration within a period of 90 days from the date of receipt of application for renewal of registration, the certificate of registration shall be deemed to have been renewed.

RULE 9(8): MAINTENANCE AND PRESERVATION OF RECORDS

Every Genetic Counselling Centre, Genetic Laboratory, Genetic Clinic, Ultrasound Clinic and Imaging Centre shall send a complete record in respect of all pre-conception or pregnancy related procedures/techniques/tests conducted by them in respect of each month by 5th day of the following month to the concerned Appropriate Authority.

RULE 18A(6): CODE OF CONDUCT TO BE OBSERVED BY APPROPRIATE AUTHORITY

All the Appropriate Authorities including the State, District and Sub-district notified under the Act, inter-alia, shall submit quarterly progress report to the Government of India through State Government and maintain Form H for keeping the information of all the registrations made readily available.

*President, CMAAO and HCFI; Past National President, IMA
Group Editor-in Chief, IJCP Group
†Advocate and Legal Advisor, HCFI

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Medtalks with Dr KK Aggarwal

CMAAO Coronavirus Facts and Myth Busters

Universal Face Shields for COVID-19

The Centers for Disease Control and Prevention (CDC) has recommended that all Americans should wear cloth masks in public to check the transmission of COVID-19 coronavirus, but another form of personal protective equipment (PPE) - **plastic face shields** - might be a better idea.

A *JAMA* Viewpoint recently published by Eli Perencevich, MD, of the University of Iowa, and colleagues discussed how face shields for the community may be a viable alternative.

Face shields can be reused indefinitely and can be easily cleaned with soap and water, or common household disinfectants. They are comfortable to wear, protect the portals of viral entry, and even diminish the potential for autoinoculation by preventing the wearer from touching their face.

Additionally, face shields do not have to be removed to communicate with others.

A simulation study of influenza virus noted that face shields reduced viral exposure by 96% when worn within 18 inches of a cough, and when this study was repeated using the recommended distancing protocol of 6 feet, inhaled virus was reduced by 92%. Face shields form an important PPE component for healthcare workers.

COVID-19 Might be Most Transmissible in the Presymptomatic Period

Anthony L. Komaroff, MD reviewed He X, et al. Nat Med. 2020 Apr 15.

Peak infectivity is estimated to occur 2 days prior to symptom onset.

Influenza has been shown to be most transmissible at or just before the onset of symptoms, while severe acute respiratory syndrome (SARS) is most transmissible at 7-10 days after symptom onset.

A team from Wuhan, China, created models based on data from two different studies of patients with COVID-19. Overall, 414 serial throat swabs were obtained from 94 moderately ill patients, starting at symptom onset and continuing for the next 32 days. This was followed by obtaining data from 77 transmission pairs and estimation of an incubation period of 5.2 days. The researchers found the highest viral loads on throat swabs collected at symptom onset. The loads were found to rapidly decline over the next 7 days. They estimated that 44% of secondary cases were infected in the 2 days prior to onset of symptoms, at least among transmissions that occurred among people in close contact (e.g., households).

The researchers concluded that COVID-19 is highly infectious in the 2 days before symptom onset. The conclusion is based on modeling: No samples were obtained in patients before onset of symptoms. The findings are; however, consistent with anecdotal evidence of relatively frequent spread by asymptomatic carriers. If this hypothesis is correct, quarantining will be less effective in controlling this virus than it was with SARS, and aggressive tracing of contacts will be the key. (*NEJM*)

SARS-CoV-2 Found in Aerosols in Hospital Staff Areas, Public Places

New findings, published in the journal *Nature*, provide additional evidence indicating that severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) can persist in aerosol samples. Researchers in Wuhan quantified SARS-CoV-2 RNA concentrations in aerosol samples obtained from 30 sites inside two hospitals dedicated to treating COVID-19, as well as from several public areas.

In patient **areas,** viral RNA concentrations were very low or undetectable (e.g., intensive care units [ICUs], coronary care unit [CCU]), except in a patient mobile toilet room, which was not ventilated.

In medical **staff areas,** some sites, including rooms where PPE was removed, had high SARS-CoV-2 RNA levels. However, the levels became undetectable following better sanitization procedures.

Among public **areas,** two areas that got a lot of foot traffic, i.e., the entrance to a department store and a site next to one of the hospitals, had high viral RNA concentrations.

SARS-CoV-2 may be potentially transmitted via aerosols. Room ventilation, open space, sanitization of protective apparel and appropriate use and disinfection of toilet areas can help limit the concentration of SARS-CoV-2 RNA in aerosols. (*NEJM*)

COVID-19 in Healthcare Personnel

Stephen G. Baum, MD reviewed Heinzerling A, et al. MMWR Morb Mortal Wkly Rep. 2020 Apr 17; Burrer SL, et al. MMWR Morb Mortal Wkly Rep. 2020 Apr 17; Chow EJ, et al. JAMA. 2020 Apr 17.

Initial data on vulnerability to, manifestations of, and steps to prevent COVID-19 in healthcare workers have been presented in three early studies.

SARS-CoV-2 infection of healthcare personnel (HCP) was imminent, provided the virus is highly contagious via the respiratory route and has the potential to be transmitted from symptomatic, presymptomatic and asymptomatic persons and given the shortage of appropriate PPE.

Three groups have reported details of early HCP infections with SARS-CoV-2.

Heinzerling and colleagues reported HCP exposure from one of the earliest community-acquired cases in Solano County, California, in February 2020. An unsuspected, and hence undiagnosed patient was subjected to multiple aerosol-generating procedures under only standard precautions that exposed some 121 HCP. Of these, 35.5% developed COVID-19–compatible symptoms within 14 days of exposure and were tested for SARS-CoV-2.

Three among these had positive tests; these and 34 other HCP were interviewed. It was noted that risk factors for COVID-19 acquisition included doing a **physical examination and having long exposure during nebulizer treatments.**

Those with high or medium risk were monitored. Of 145 HCP with potential exposure being monitored, 36% became symptomatic and were tested for SARS-CoV-2, still yielding only the 3 positive HCP, one considered at medium exposure risk and 2 at high risk. None of these 3 HCP consistently wore significant PPE. Since little community infection was present, and given the lack of HCP PPE, these infections are considered to be work-associated.

Burrer and colleagues characterized 9,282 HCP-associated cases of COVID-19 in the US up to April 9, 2020. Median age was 42 years and 73% were female. Where racial data were available, 72% were White, 21% were Black and 5% were Asian. Exposure was noted in healthcare (55%), households and community settings, with 38% reporting at least one underlying health condition. Most reported fever, cough or shortness of breath; 8% reported no symptoms. About 90% were not hospitalized, but severe outcomes including 27 deaths occurred, mostly in HCP aged ≥65 years.

Chow and colleagues assessed the efficacy of current COVID-19 screening practices in HCP. Among 50 HCP identified as exposed and infected in King County, Washington, in February 2020, 48 were interviewed. Median age was 43 years, 77.1% were female and 77.1% were involved in direct patient care. About 47.9% reported chronic medical conditions. The most common symptoms included cough (50%), fever (41.7%) and myalgias (35.4%). Of the 16.7% without cough, fever, shortness of breath or sore throat, the most common complaints included chills, myalgias, coryza and malaise.

The authors stated that if chills and myalgias had been included in screening, case detection would have gone up from 83.3% to 89.6%. Among those who were interviewed, 64.6% reported working a median of 2 days (range, 1-10 days) while symptomatic. (*NEJM*)

A Pregnant Woman in Switzerland Delivered a Stillborn Infant at 19 Weeks' Gestation After Testing Positive for COVID-19

David Baud, MD, PhD, of the Lausanne University Hospital in Switzerland, and colleagues, reported in *JAMA* that this case of miscarriage during the second trimester of pregnancy in a woman with COVID-19 seems to be related to placental infection with SARS-CoV-2, supported by virological findings in the placenta.

After delivery, swabs and biopsies of the placenta tested negative for bacterial infection, but positive for SARS-CoV-2. The placenta remained positive at 24 hours after delivery.

Placental infection leading to miscarriage or fetal growth abnormalities were noted in 40% of maternal infections with SARS and Middle East respiratory syndrome (MERS) coronaviruses. (*Medpage Today*)

The Novel Coronavirus (SARS-CoV-2) Stays Significantly Longer in Stool Than in the Lungs and Serum

Reuters: The management of stool samples is important for controlling the virus, suggest clinicians in China.

Dr Tingbo Liang and colleagues of First Affiliated Hospital in Hangzhou estimated the viral load from 3,497 respiratory, stool, serum and urine samples from 96 patients with SARS-CoV-2 infection.

Infection was confirmed in all patients by means of sputum and saliva samples, report researchers in *The BMJ*. RNA was detected in the stool of 55 (59%) patients, in the serum of 39 (41%) patients and the urine of only 1 patient.

The average lifespan of the virus was estimated as 22 days (range 17-31 days) in stool compared to 18 days (range 13-29 days) in respiratory tissue and 16 days (range 11-21 days) in serum.

The virus was found to persist for a longer period and peak later in respiratory tissue in people with severe disease. The average duration of virus in respiratory samples of patients with severe disease was 21 days (range 14-30 days) compared with 14 days (range 10-21 days) in those with mild disease.

Among patients with mild disease, the viral loads peaked in respiratory samples in the second week following disease onset, whereas viral load continued to be high during the third week in those with severe disease.

Reducing viral loads through clinical means and strengthening management during each stage of severe disease can go a long way in preventing the spread of the virus.

The virus was also found to persist longer in men than women and in patients over age 60 years, which may explain, in part, the high rate of severe illness in older patients.

Case Definition Published for Rare Child Syndrome

Pediatricians from UK have published a working definition of an inflammatory syndrome affecting a very small number of children that may be linked to COVID-19.

The working definition includes:

- A child presenting with persistent fever, inflammation and evidence of single or multi-organ dysfunction with additional features. This may include children fulfilling the criteria, completely or partially, for Kawasaki disease.
- Exclusion of any other microbial cause.
- SARS-CoV-2 polymerase chain reaction (PCR) testing may be positive or negative.

(*Medscape*)

Nearly Two-thirds of US Patients with COVID-19 Report Gastrointestinal Symptoms, According to a Multicenter Study

Harvard Medical School: Overall, 61.3% of patients presented with at least one gastrointestinal symptom, including most commonly anorexia (34.8%), diarrhea (33.7%) and nausea (26.4%).

Gastrointestinal symptoms were the initial symptoms in 14.2% of patients and were the predominant presenting complaint in 20.3% of patients, suggested the online report in *Gastroenterology*.

More patients with, than without, gastrointestinal symptoms also had fatigue (65.1% vs. 45.5%, respectively), myalgia (49.2% vs. 22%), sore throat (21.5% vs. 9.8%) and loss of smell or taste (16.9% vs. 6.5%).

Nausea and anorexia were found to have significant association with anosmia and ageusia after controlling for other factors, while other gastrointestinal symptoms were not.

Laboratory findings did not differ significantly between patients with and without gastrointestinal symptoms. Of the 202 patients who had completed their hospitalizations at the time of data analysis, 17.5% needed ICU stay, 13% required mechanical ventilation and 15.8% died. These rates did not differ significantly between patients with and without gastrointestinal symptoms.

It is important to consider COVID-19 in patients presenting with new or acute-onset digestive symptoms, even in the absence of respiratory complaints, fevers or other typical COVID-19 symptoms.

Failure to identify COVID-19 patients with primarily digestive symptoms might result in delayed care, inadequate isolation and further transmission.

Patients presenting with new or acute-onset digestive symptoms should be triaged and treated in the same way as patients presenting with respiratory COVID-19 symptoms.

Fact: There were trends toward lower rates of ICU stay and death in the group with gastrointestinal symptoms, which is similar to early trends seen in New York City.

Should Face Shields Replace Face Masks to Ward Off Coronavirus?

In the April 29 issue of *Journal of the American Medical Association*, experts led by Dr Eli Perencevich, of the University of Iowa Department of Internal Medicine and the Iowa City VA Health Care System state that face shields might replace masks as a more comfortable and more effective hindrance to COVID-19.

The clear plastic face shield is already in use by healthcare personnel.

These are quickly and affordably produced and distributed.

The US CDC has also started advocating the use of cloth masks to help stop COVID-19 transmission. Laboratory testing has pointed that cloth masks provide only some filtration of virus-sized aerosol particles.

According to the group, "face shields may provide a better option."

To be most effective in curbing viral spread, a face shield must extend to below the chin and should cover the ears as well with no exposed gap between the forehead and the shield's headpiece.

Shields have advantages over masks. They are reusable, simply requiring cleaning with soap and water or common disinfectants. Shields are usually more comfortable to wear than masks, and form a barrier that keeps people from touching their own faces.

When speaking, people sometimes pull down a mask, but that is not required with a face shield.

Additionally, the use of a face shield also reminds one of maintaining social distancing, but allows visibility of facial expressions and lip movements for speech perception.

A simulation study revealed that face shields could reduce immediate viral exposure by 96% when worn by a simulated healthcare worker within 18 inches of a cough. As the study was repeated at the physical distancing distance of 6 feet, it was noted that face shields reduced inhaled virus by 92%.

Face shields should only be one part of any infection control effort, along with social distancing and hand washing. (*US News*)

A Coronavirus Mystery Riddle: Why Some Places Fare Better?

The coronavirus has affected almost every country, but its impact has been uneven. Metropolises such as New York, Paris and London have been devastated, while teeming cities like Bangkok, Baghdad, New Delhi and Lagos have largely been spared.

There are several theories and speculations for why the virus has overwhelmed some places and left others relatively untouched but there are no definitive answers.

Hundreds of studies are underway on how demographics, public health and genetics could possibly explain the differing impact of the virus.

However, each possible explanation seems to come with caveats and counterevidence. **If older people are highly vulnerable, for instance, Japan, with its aging population, should be devastated. But that is not true.**

Coronavirus Vaccines

- Coronaviruses: Virus Spike protein, Envelope, Membrane, RNA, Nucleic.
- Difficulties: Virus behaves like HIV, causes immune inflammation, causes cytokine storm, causes thrombo-inflammatory reactions, brings down immunity and has latency.
- Immunity: Short-term or long-term; Booster doses, immunity lasting 1 year
- Herd immunity threshold: R-1/R, Protecting older people, disabled people, immunocompromised people.
- Development Time long: Pre-clinical studies 3 months, small phase I study for safety, medium size phase II study, formulation, dose, safety immunogenicity and reactogenicity, large phase III efficacy.
- Because people have no immunity to COVID-19, it's likely that two shots will be needed, 3-4 weeks apart. People would likely start to achieve immunity to COVID-19 1 week after the first vaccination and large boost after the second dose.
- There are 120 vaccine initiatives around the world. Virus vaccines (Live attenuated or inactivated): At least seven teams are developing vaccines using the virus itself, in a weakened or inactivated form. Sinovac Biotech in Beijing has initiated the testing of an inactivated version of SARS-CoV-2 in humans. The inactivated version will also be developed in the Serum Institute.
- Viral-vector vaccines (Replicating or non-replicating): The following platforms are being used: Measles, Chimp adenovirus, Adenovirus 26, Pox virus vectors, etc.
- Nucleic-acid vaccines: (in the form of DNA or RNA) for a coronavirus protein that prompts an immune response. The nucleic acid is inserted into human cells, which then churns out copies of the virus protein; most of these vaccines encode the virus's spike protein.
- Protein-based vaccines: Many researchers want to inject coronavirus proteins directly into the body. Fragments of proteins or protein shells with adjuvants that mimic the coronavirus's outer coat can also be used (virus subunit or virus like particle).

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72nd Annual National Conference of Indian Psychiatric Society (ANCIPS 2020)

22ND-25TH JANUARY, 2020 | ITC ROYAL BENGAL & ITC SONAR, KOLKATA

FACE-TO-FACE WITH DR RR GHOSH ROY, ORGANIZING CHAIRPERSON, ANCIPS 2020

How do you see the current situation of the practice of Psychiatry in our country?

India is a highly populated country. It faces the challenge of meeting its population's mental health needs. It is reported that an estimated 90% of people suffering from mental illness receive no form of treatment, thus placing a high burden on the society. Additionally, there is an acute shortage in India's mental health workforce. Nearly two-third of India's population live in rural areas, while most psychiatrists reside and operate in major cities and towns. Therefore, psychiatry in India is an almost entirely urban phenomenon. This uneven distribution of mental health professionals contributes to gross disparity between the mental health needs of the Indian population and available professional services. Additionally, the patients belong to varying socioeconomic strata. Medicines are very expensive for some patients. Therefore, the government should take some steps in this regard.

Do we have enough psychiatrists in India?

No, not really. The current situation is far from ideal. The number of psychiatrists in India is presently way lower than the amount that should be there. We have 0.75 psychiatrists per 1,00,000 population. So overall, the number of professionals available is very low. However, things are changing for the better. Earlier, not many doctors chose psychiatry as a post-graduate discipline. But now, an increasing number of MBBS doctors are opting for this specialty. We are hopeful that the numbers will soon increase.

What are the challenges of working as a psychiatrist in India?

I would say social stigma is the biggest challenge. Talking about mental illness is still considered taboo in our country. People visit babas more often than psychiatrists. Additionally, there are several myths surrounding mental illness and medications. People rush to the hospital if they experience chest pain but are reluctant to visit a doctor for mental health issues. Mental health is among the most neglected areas in India. There is an urgent need to create awareness about mental health in the Indian society.

IN CONVERSATION WITH DR GAUTAM SAHA, ORGANIZING SECRETARY, ANCIPS 2020

What is your advice to upcoming psychiatrists?

I would advise them to stay focused and have patience. Don't look for shortcuts to success. It is important to use your skills and training for the benefit of your patients. Always invest time in your patient and profession. Become a member of the Indian Psychiatric Society. It will serve your colleagues and the society at large.

What are you looking forward to most in this year's conference?

This year, we are hosting the 72nd Annual Conference of Indian Psychiatric Society, and Kolkata is hosting its sixth. The scientific committee has drafted a highly enriching and interesting academic program to keep the delegates engaged throughout the conference. We look forward to an active participation from the delegates during all the sessions and expect them to benefit from the great learning experience that we have to offer.

What does this year's conference offer the delegates?

ANCIPS is known for high academic standards. We at #ANCIPS2020 endeavor to enhance the scientific knowledge and enrich the experience of the delegates. We have invited internationally renowned faculty for scientific deliberations and various platforms are available for social interactions. The conference aims to bring together mental health professionals from across the globe to interact and build new relationships.

The theme for this year is "Smart Psychiatry in Digital Era". If the essence of psychiatry is healing the mind, the goal of technology in psychiatry is to systematize the art of mind healing. Digital applications and novel mobile technologies have the potential to change the nature of the psychiatrist-patient relationship and future clinical practice as regards diagnosis, follow-up and treatment,

but need to be explored further. This year's theme aims to explore these new approaches in psychiatry.

We have an extensive and interesting spread of key sessions lined for the delegates. The scientific program incorporates a wide range of CME, invited contributions, free papers, guest lectures, symposia, poster sessions, orations, etc. With latest information on the advances in scientific and clinical research that focuses on issues related to practice of Psychiatry, all the sessions will add to the knowledge of the participants.

TREATMENT OF BIPOLAR DISORDERS

Dr Bruce J Schwartz, New York

- Challenges of bipolar disorder – Complexity of the clinical presentation (heterogeneous symptom picture, comorbid psychiatric disorders and difficulty obtaining accurate history); Recognition of bipolar depression (hypersomnia and rapid onset); When psychosis is present, differentiating from schizoaffective disorder or schizophrenia; Lack of adherence to treatment; Necessity of a phase relevant treatment strategy.
- Phases of bipolar disorder treatment – Acute mania with or without psychotic features; hypomania; bipolar depression and maintenance.
- FDA-approved lithium indications – Bipolar I acute mania and mixed states; Bipolar I maintenance monotherapy.
- Lithium has a half-life of 24 hours. Initial dosing is 600 mg/day (divided or single dose); maintenance – serum levels 0.6-1.0 mmol/L; baseline testing – BUN, creatinine, thyroid, CBC, ECG and pregnancy (when indicated).
- In a systematic review and meta-analysis of randomized controlled trials, lithium treatment was shown to reduce the risk of relapse in bipolar disorder.
- In a comparison of the effectiveness of divalproex sodium (DVPX) with that of lithium and placebo in patients with acute mania, both DVPX and lithium were significantly more effective than placebo in reducing the symptoms of acute mania.
- Lithium side effects – *Cognitive:* dulling, loss of creativity, subjective memory impairment; *Neurological:* action tremor, lethargy, fatigue, weakness, EEG changes; *Gastrointestinal (GI):* nausea, vomiting, diarrhea, abdominal pain, anorexia; *Endocrine:* goiter, hypothyroidism, increased TSH, increased PTH, hyperparathyroidism; Weight gain; *Skin:* acne, psoriasis,etc.; *Cardiac:* T-wave abnormalities, sinoatrial node dysfunction; *Renal:* Polyuria, nephrogenic diabetes insipidus, interstitial fibrosis, etc.; *Toxicity:* Lithium levels may be increased by water loss from fever, vomiting, diarrhea or diuretics.
- Atypical (Second-generation) antipsychotics in mania – All such agents are apparently effective; generally no worsening of depression; have antidepressant effects (quetiapine) and some adjunctive mood stabilization effects; less extrapyramidal symptoms (EPS) but metabolic risks, especially weight gain and abnormalities in glucose, lipids or prolactin; titrate rapidly, use adjunctively and consider discontinuation when patient is stable.
- Carbamazepine – Immediate and extended-release forms with initial dosing of 200-400 mg/day (divided); maintenance serum concentration: 4-12 μg/mL; monitor CBC, platelets, LFT, electrolytes; Side effects: sedation, dizziness, ataxia, double/blurred vision, GI distress, hematopoietic suppression, hepatotoxicity (rare), dermatologic, hyponatremia, SIADH; Teratogenicity (1%).
- Carbamazepine represents an acute and prophylactic treatment of bipolar disorder; used as adjunctive treatment with other mood stabilizers.
- Acute mania – First-line treatment: Severe: Lithium or DVPX/Carbamazepine + antipsychotic; ECT for treatment-resistant state or in pregnancy; Clozapine for refractory states; Less severe: Lithium or DVPX/Carbamazepine or antipsychotic.
- Preventing relapse – The BALANCE trial: For people with Bipolar I disorder, for whom long-term therapy is clinically indicated, both combination therapy with lithium *plus* valproate and lithium monotherapy are more likely to prevent relapse than valproate monotherapy.
- Bipolar maintenance – Gold standard is lithium. There is good evidence for quetiapine, olanzapine, risperidone, aripiprazole. Alternatives include lamotrigine, carbamazepine and DVPX. For depressive relapses, consider lamotrigine, lithium, quetiapine, lurasidone, cariprazine. Lamotrigine and quetiapine are considered as monotherapy in Bipolar II.
- Bipolar depression – First-line: Lithium, quetiapine, lamotrigine, OFC (olanzapine/fluoxetine combination), lurasidone, cariprazine.

- Quetiapine monotherapy is FDA-approved and is efficacious and well-tolerated for the treatment of bipolar depression.
- Lurasidone – Approved for bipolar depressed phase; initial dose 20 mg with food, maximum dose 120 mg once daily; common side effects: diarrhea, nausea, vomiting, somnolence, anxiety; serious side effects: orthostatic hypotension, agranulocytosis, tardive dyskinesia, etc.
- Cariprazine – Approved for acute mania, mixed state and bipolar depression; common side effects: nausea, akathisia, dizziness, sedation; serious side effects: orthostatic hypotension, ischemic stroke, etc.
- Investigational bipolar disorder treatments – Pramipexole; Protein kinase C inhibitor; ASA and minocycline; L-type calcium channel antagonists.
- Pramipexole is of value for patients in a treatment-resistant depressive episode.

THE IMPACT OF TECHNOLOGY ON HUMAN BEHAVIOR: HOW TO EVALUATE IN CLINICAL PRACTICE?

Dr G Prasad Rao, Hyderabad

- Over the past decade, there have been massive developments in web-based and Internet technologies, with the introduction of smartphones.
- The rapid growth in the use of smartphones has opened a new world of opportunities for use in behavioral health care.
- Mobile phone software applications (apps) are available for a variety of useful tasks to include symptom assessment, psychoeducation, resource location and tracking of treatment progress.
- Mental health technology includes mobile phones, I Pads, wearable devices, etc. Technology has opened a new frontier in mental health support and data collection.
- Mobile devices like cell phones, smartphones, wearables and tablets, are giving the public, doctors and researchers new ways to access help, monitor progress and increase understanding of mental well-being.
- Mental health technologies may serve as an introduction to care – Technology may be a good first step for those who have avoided mental health care in the past.
- Mobile mental health support can be very simple but effective. New technology can also be packaged into an extremely sophisticated app for smartphones or tablets. Such apps might use the device's built-in sensors to collect information on a user's typical behavior patterns. If the app detects a change in behavior, it may provide a signal that help is needed before a crisis occurs.
- Some apps are stand-alone programs that promise to improve memory or thinking skills. Others help users to connect to a peer counselor or to a healthcare professional.
- This new technology frontier includes a lot of uncertainty. There is very little industry regulation and very little information on app effectiveness, which can lead consumers to wonder which apps they should trust.
- Mental health technologies have the advantage of convenience. Treatment can take place anytime, anywhere and may be ideal for those who have trouble with in-person appointments.
- Clients can seek treatment options without involving other people (anonymity).
- There is an advantage of lower cost. Some apps are free or cost less than traditional care.
- Technology can help mental health providers offer treatment to people in remote areas or to many people in times of sudden need.
- Some technologies might be more appealing than traditional treatment methods, which may encourage clients to continue therapy.
- Technology can provide round-the-clock monitoring or intervention support.
- Technology can quantitatively collect information such as location, movement, phone use and other information.
- Telehealth could improve access to mental health care. In addition to apps and Internet portals, telehealth, consulting with a health care provider via phone or video conference, offers promising opportunities for health technology.
- Some evidence on technology use – Michigan study found that Facebook use led to a decrease in happiness and overall life satisfaction; A team of Australian researchers conducted two studies and found that compulsive internet use by adolescents leads to poorer mental health; Research coming out of the University of Gothenburg in Sweden found a link between heavy cell phone use in young adults and depressive symptoms; A Swansea University study found that heavy internet users experience psychological symptoms of withdrawal when they stop using.

- The biggest concern with technological interventions is obtaining scientific evidence that they work and that they work as well as traditional methods.
- Data security and privacy is a major concern. Some of the most common threats to data security and patient privacy come from unauthorized access or physical loss of the mobile device. The app software used on smartphones also poses a unique risk to patient confidentiality.
- Teleconsultation is not valid for medicolegal purpose.
- New mental health technology is part of our clinical practice. There is rapid take over of our day-to-day practice.
- The utility is definitely there but the legal binding laws are not yet clear.
- The question of who will or should regulate mental health technology and the data it generates needs to be answered.
- Apps deal with very sensitive personal information, so app makers need to be able to guarantee privacy for app users.

RECENT ADVANCES IN TREATMENT-RESISTANT DEPRESSION

Dr Rajnish Mago, Philadelphia

- Not all so-called depression is treatable with medications or other biological treatments.
- L-methylfolate – It is very important because it is the only form that enters the brain and it indirectly regulates the rate-limiting enzymes for synthesis of serotonin, dopamine and norepinephrine. Do not recommend folic acid instead.
- The mathematics of tyramine – Threshold: Tyramine 6 mg or more at a time; Tyramine per 100 g of each food in the meal × Amount of food consumed.
- So avoid 3 ways of getting into trouble – Foods with very high tyramine; Large quantities of food with moderate tyramine; Multiple foods with moderate tyramine. Tyramine content in idlis is low if: there is more rice and less daal in the idli batter; stored at 4°C; stored for fewer number of days.
- Eat fermented foods with care.
- Cheddar cheese – 100 g of cheese contains about 22 mg tyramine.
- Pizza with plain mozzarella cheese, Veggie pizza, Pepperoni (fresh) pizza are okay but take Specialty or Gourmet pizza with CAUTION.
- Tyramine-containing soya-related items – Fermented soybean, fermented tofu, tofu kept in the fridge for few days, chilli soybean paste, miso.
- Pramipexole – May be most suited for those with severe anhedonia, lack of motivation, inability to initiate behaviors and unreactive mood. Potential side effects of pramipexole – Most common: Nausea; potentially serious or disturbing: Dizziness/postural hypotension; sudden sleepiness; increased sexual arousal; compulsive behaviors.
- Tips on pramipexole for treatment-resistant depression (TRD) – Dose: 1-5 mg/day, mean dose 2.5 mg/day; Starting dose: 0.25 mg in ≤45 years old, 0.5 mg in >45 years old; Usually at bedtime; Duration of trial: 4-6 weeks at the maximally-tolerated dose.
- Intermittent theta burst stimulation (iTBS) – Two patients who failed on numerous antidepressants, antipsychotics and mood stabilizers and had what seemed like very treatment-resistant recurrent major depression, both responded within a week to theta burst TMS.
- Two studies by Thakurta et al suggested the beneficial effects of ketamine in resistant depression. Ketamine infusion was found to be effective in reducing the Scale for Suicidal Ideation (SSI) and 17-item Hamilton Depression Rating Scale (HDRS) scores, and the change remained significant from minute 40 to 230 at each time point in one study. In another study, ketamine infusion was effective in reducing the HDRS scores, and the change remained significant from minute 80 to day 3 post-infusion at each time point.
- The oral route of administration is probably the least expensive and most convenient way to administer ketamine in indicated contexts in depressed patients.

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Indian Journal of Clinical Practice, Vol. 30, No. 12, May 2020

News and Views

Starchy Snacks versus Sports Supplements for Muscle Recovery

A new study suggests that sports energy bars and drinks are no better than cheap, carb-rich foods, such as potato pancakes, hash browns and fries to replenish muscles post-exercise.

Manufacturers claim that their products are better than relatively cheap, ordinary snacks at restoring energy levels after exercise and maximizing athletic performance. However, the findings of this study showed that sports supplements elicited a significantly higher increase in blood glucose and insulin half an hour after consuming the second snack.… (*Medical News Today*)

CDC Launches National Viral Genomics Consortium to Better Map SARS-CoV-2 Transmission

The Centers for Disease Control and Prevention (CDC) has launched the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) Sequencing for Public Health Emergency Response, Epidemiology and Surveillance (SPHERES) consortium. The initiative is aimed at expanding the use of whole genome sequencing (WGS) of the coronavirus disease (COVID-19) virus.

This national network of sequencing laboratories will expedite the release of SARS-CoV-2 sequence data into the public domain. It is set to provide consistent, real-time sequence data to the public health response teams investigating cases and clusters of COVID-19 across the country… (*CDC*)

Neuromedin U Plays a Crucial Role in Learning and Memory

A study conducted on roundworms, published in the journal *Nature Communications* unravelled that the signalling molecule Neuromedin U plays an essential role in the learning process. This protein has been found to allow the brain to recall negative memories and, as such, learn from the past. The communication between brain cells has been seen to be similar between worms and humans.

Nivolumab-based Treatment Effective in Early, Unfavorable Hodgkin's

Nivolumab monotherapy resulted in complete remissions in more than 50% of patients with early-stage unfavorable classic Hodgkin's lymphoma, and combined with doxorubicin, vinblastine and dacarbazine (AVD) led to responses in nearly all, suggested a phase II study.

In the randomized NIVAHL trial, interim restaging after four doses of nivolumab alone revealed that 96% achieved an objective response, with complete responses in 51%, reported researchers in *JAMA Oncology*.

For Flu Vaccine Dosing in Kids, Two is Better Than One

A double dose of the influenza vaccine was found to be more effective than a single dose, researchers reported in *JAMA Pediatrics*.

Among 7,533 children aged between 6 months and 8 years, a primer dose and a subsequent booster dose exhibited greater vaccine efficacy in comparison with a single dose (58% vs. 46%), and was associated with a decreased likelihood of influenza after data adjustment (adjusted OR 0.61, 95% CI 0.40-0.94), reported researchers.

Higher Baseline Fitness may Help Maintain Weight Loss

Participants with higher levels of fitness when beginning a behavioral weight-loss intervention were able to keep off more weight over the 18-month study period, compared with those with lower levels of fitness at baseline. Those with higher baseline fitness could also achieve higher levels of moderate-to-vigorous physical activity at the 18-month mark, Adnin Zaman, MD, said during a virtual news conference held by the Endocrine Society. The study had to be presented during ENDO 2020, the society's annual meeting, which was canceled due to the COVID-19 pandemic… (*Medscape*)

Alert Over Multisystem Hyperinflammatory State in Children

An alert has been issued from within NHS England over an increasing number of cases of new symptoms in children requiring ICU admission that may be linked to the new coronavirus.

The symptoms have been described as a multisystem inflammatory state with overlapping features of toxic shock syndrome and atypical Kawasaki disease, with

blood parameters in line with severe COVID-19. The alert stated, "*There is a growing concern that a SARS-CoV-2 related inflammatory syndrome [is] emerging in children in the UK or that there may be another as yet unidentified infectious pathogen associated with these cases.*" (*Medscape*)

Pre-eclampsia Linked with Mental Health Risk in Children

Hypertensive disorders in women during pregnancy, particularly pre-eclampsia, are associated with a significantly increased risk for mental health disorders in children, independent of the mental health history of either parent or of other potential risk factors, suggests new research. Researchers noted a 66% higher risk for any mental disorder in children whose mothers had pre-eclampsia. There was a twofold higher risk for a childhood mental disorder in children whose mothers had severe pre-eclampsia. The findings were published online April 20 in the journal *Hypertension*.

Benign Kidney Tumors Shrink with mTOR Inhibitor

Most patients with a nonmalignant form of kidney tumor exhibited significant tumor shrinkage with the mammalian target of rapamycin (mTOR) inhibitor everolimus, revealed a small multicenter clinical trial.

Within 4 months after the initiation of treatment for angiomyolipomas, tumor volume was found to shrink by at least 25% in 10 of 18 patients. By 6 months, 10 of 14 patients had at least a 25% reduction in tumor. Median shrinkage at both time points was found to be almost 60%. The findings are published online in the *Journal of Urology*.

Hormone Levels Linked with Future Breast Cancer Risk

Circulating levels of progesterone may have a role in predicting future breast cancer incidence in older women, suggests new research published in *JAMA Network Open*. Over a 12-year follow-up period, postmenopausal women had a modest 16% higher risk for breast cancer with each standard deviation increase in progesterone levels (hazard ratio [HR] 1.16, 95% CI 1.00-1.35, p = 0.048), reported researchers. The association between higher progesterone levels was shown to be even stronger for invasive breast cancers (HR 1.24, 95% CI 1.07-1.43, p = 0.004).

Preschoolers with High BMI have Greater Fracture Risk as Teens

Children with overweight or obese body mass index (BMI) measures at preschool age were found to have significantly increased odds of suffering upper- and lower-limb fractures before age 15 years in comparison with normal weight children, suggested data from almost 4,70,000 children.

The findings published in the *Journal of Bone and Mineral Research* suggested that children with a BMI in the overweight or obese ranges at first assessment were significantly more likely than their normal weight counterparts to suffer lower-limb fractures (adjusted hazard ratios [aHRs], 1.42 and 1.74, respectively) and upper-limb fractures (aHRs, 1.10 and 1.19, respectively) during the follow-up period. The total incidence of fractures during childhood for those who were underweight, normal weight, overweight or obese, was estimated as 9.20%, 10.06%, 11.28% and 13.05%, respectively.

Up to 7 Years' Jail for Attack on Health Workers: Ordinance

New Delhi: With several reports of attacks on healthcare personnel involved in treating and tracking COVID-19 cases across the nation, the Cabinet has approved an ordinance that makes acts of violence against doctors and frontline personnel a cognizable and non-bailable offence punishable with prison terms of up to 7 years.

I&B Minister Prakash Javadekar stated that a person violating the law will be liable to a jail term of up to 7 years and a fine of up to Rs. 5 lakh. He further stated that the Cabinet had approved promulgation of an ordinance to amend the Epidemic Diseases Act, 1897, in order to ensure that those who assault or abuse healthcare personnel receive punishment… (*ET Healthworld – TNN*)

Gout Increases Risk of Heart Failure in Older Adults

Older adults with gout were found to have an increased risk for incident heart failure in a large population-based cohort study.

Among participants enrolled in the REasons for Geographic And Racial Differences in Stroke (REGARDS) study, the multivariate-aHR for heart failure hospitalization for those with gout was estimated as 1.97 (95% CI 1.22-3.19) compared with patients without gout, reported researchers online in *Arthritis Research & Therapy*. Gout was associated with an increased risk for heart failure hospitalization with both reduced (HR 1.77, 95% CI 0.83-3.79) and preserved left ventricular ejection fraction (LVEF; HR 2.32, 95% CI 1.12-4.79).

WHO Guidance to Help Detect Iron Deficiency and Protect Brain Development

Iron deficiency in children below 2 years of age can have significant adverse effects on brain development, resulting in negative consequences on learning and school performance later in life.

The World Health Organization (WHO) has issued new guidance, "World Health Organization guidelines on the use of ferritin concentrations to assess iron status in individuals and populations," aimed at helping health workers detect iron deficiency early and avoid the most severe impacts. It shows how to best measure ferritin to help determine iron deficiency or overload… (*WHO*)

Screen Time for Babies Linked with Autism Symptoms Later

Babies who watched television or video screens at 12 months of age had more autism-like symptoms when they reached age 2, suggested a prospective study. Furthermore, 12-month-old infants who played daily with their parents had fewer autism-like symptoms at age 2, reported researchers online in *JAMA Pediatrics*. Viewing screens at 12 months of age was found to be associated with 4.2% greater autism spectrum disorder (ASD)-like symptoms compared with not viewing screens. Daily play time with a parent was tied to 8.9% fewer ASD-like symptoms compared with less frequent play, reported researchers.

New WHO Resource on Enhancing Competencies of Primary Care Nurses

WHO/Europe has published a set of resources in a bid to support countries to invest in and strengthen their primary healthcare nursing workforce.

The publication "Competencies for nurses working in primary healthcare" guides policy-makers, instructors, managers and clinicians to develop the required competencies in primary healthcare for nurses… (*WHO/Europe*)

New Bariatric/Metabolic Surgery Guidance Amid COVID-19 Outbreak

New recommendations for the management of metabolic and bariatric surgery candidates during and after the COVID-19 pandemic have been published that move the focus from BMI alone to medical conditions that are most likely be ameliorated by the procedures.

The document, a guide for both surgeons and referring clinicians, was published online May 7 as a Personal View in *Lancet Diabetes & Endocrinology*. Included in the recommendations is a guide to prioritize patients that are eligible for bariatric or metabolic surgery once the pandemic restrictions on nonessential surgery are relaxed… (*Medscape*)

WHO Statement on Tobacco Use and COVID-19

Tobacco smoking is a known risk factor for several respiratory infections and is also known to heighten the severity of respiratory diseases. A review of studies by public health experts called by the WHO on April 29, 2020 has noted that smokers have a higher likelihood of developing severe disease with COVID-19, compared to nonsmokers. WHO urges researchers, scientists and the media to be cautious about increasing unproven claims that tobacco or nicotine could diminish the risk of COVID-19… (*WHO*)

WHO Chief Highlights Complex Challenges Posed by COVID-19 Resurgence Following Easing of Restrictions

The resurgence of COVID-19 cases in South Korea, China and Germany after the stay-at-home restrictions were lifted underscores the complexity of easing these measures, said WHO Chief Tedros Adhanom Ghebreyesus.

"Over the weekend we saw signs of the challenges that may lie ahead", he told journalists. He further added, "Early serological studies reflect that a relatively low percentage of the population has antibodies to COVID-19, which means most of the population is still susceptible to the virus"… (*UN*)

Environmental Chemical Exposure Linked to Celiac Disease

Exposure to synthetic endocrine-disrupting chemicals found in pesticides, nonstick cookware and fire retardants was found to be associated with increased risk for celiac disease in children and young adults, reported a small observational study.

Young people having higher serum concentrations of dichlorodiphenyldichloroethylene (DDE) were noted to have double the risk for developing celiac disease (odds ratio [OR] 2.01, 95% confidence interval [CI] 1.07-3.78) after controlling for age, race, sex and genetic susceptibility, reported researchers in *Environmental Research*.

Five Days of G-CSF Adequate for Breast Cancer Chemotherapy

Five days of prophylactic granulocyte colony-stimulating factor (G-CSF) has been found to be as

effective as 7-10 days for preventing chemotherapy-induced febrile neutropenia in patients with early breast cancer, suggests a randomized trial. Patients assigned to the 5-day regimen of filgrastim had a 2.09% incidence of febrile neutropenia or treatment-related hospitalization per cycle of chemotherapy compared to 3.60% with 7-10 days of G-CSF. The difference was within the prespecified threshold of 3% for noninferiority. The findings were reported online in *Annals of Oncology*.

Coffee Drinking Tied to Fewer Arrhythmias

Moderate, daily coffee consumption appeared to have no apparent adverse effect for triggering incident heart arrhythmias, and was even associated with a small but statistically significant decline in arrhythmias, suggested an analysis of prospectively collected data from around 3,00,000 UK residents. It was noted that on average, each additional daily cup of coffee reduced the incidence of arrhythmic episodes by a statistically significant 3%, compared with those who drank fewer daily cups. The relationship held for people drinking as many as 5 or 6 cups of coffee daily. The data were presented at the annual scientific sessions of the Heart Rhythm Society, held online… (*Medscape*)

Botulinum Toxin Reduces Chronic Pelvic Pain in Endometriosis

An injection of botulinum toxin A may help women with chronic pelvic pain (CPP) associated with endometriosis, without causing significant adverse events, suggests a new study being presented on American Academy of Neurology (AAN). com as part of the AAN 2020 Science Highlights. The randomized, double-masked placebo-controlled study included 29 premenopausal women ages 18-50 years (median age, 30 years) with CPP and documented endometriosis. Of the 29 women, 10 in the placebo group reported no benefit at 1 month compared to 4 in the botulinum toxin group ($p = 0.048$). Those receiving the active treatment reported a greater degree of benefit ($p = 0.027$). Women who reported no benefit in the placebo group at 1 month had higher odds of requesting a second injection (OR, 7.94; 95% CI, 1.1-52.34; $p = 0.032$). Disability was found to worsen in the placebo group but it didn't change in the treatment group. At 1 month, only those receiving treatment had fewer muscle spasms… (*Medscape*)

FDA Approves First Therapy for Patients with Lung and Thyroid Cancers with a Certain Genetic Mutation or Fusion

The US Food and Drug Administration (FDA) has granted approval to selpercatinib capsules for the treatment of three types of tumors, namely non-small cell lung cancer, medullary thyroid cancer and other types of thyroid cancers, in patients with tumors having an alteration (mutation or fusion) in a specific gene – the RET or rearranged during transfection.

This is the first therapy that has been approved specifically for cancer patients with the RET gene alterations… (*FDA*)

FDA Approves First Targeted Therapy for Aggressive Form of Lung Cancer

The US FDA has granted approval to capmatinib for the treatment of adult patients with non-small cell lung cancer (NSCLC) that has spread to other parts of the body.

This is the first FDA-approved drug to treat NSCLC with specific mutations that lead to mesenchymal-epithelial transition or MET exon 14 skipping. The Foundation One CDx assay (F1CDx) was also approved as a companion diagnostic for capmatinib… (*FDA*)

BMI, Weight Change Tied to Prostate Cancer Outcomes

Obesity and weight gain after prostate cancer diagnosis were found to significantly heighten the risk of cardiovascular disease (CVD) and all-cause mortality and possibly prostate cancer-specific mortality (PCSM), indicates a large retrospective review.

Obesity at the time of diagnosis was linked with 23-24% higher CV and all-cause mortality and a trend toward higher PCSM. The odds of dying of prostate cancer rose by 65% in men who gained more than 5% of their body weight after prostate cancer diagnosis, with the all-cause mortality being 27% higher. The findings were published online in the *Journal of Clinical Oncology*.

WHO Academy and the WHO Info Mobile Applications Launched

WHO has announced the launch of the WHO Academy app that will support health workers during COVID-19, and the WHO Info app designed to inform the general public.

The WHO Academy has launched a mobile app aimed at enabling health workers to expand their life-saving skills in the fight against the COVID-19 pandemic. The app aims to provide health workers with mobile access to COVID-19 knowledge resources, developed by WHO, encompassing up-to-the-minute guidance, tools, training, and virtual workshops to help them care for COVID-19 patients and protect themselves as well… (*WHO*)

Multiple Sclerosis Linked to Increased Risk for Stroke, CVD, Death

Multiple sclerosis (MS) has been found to be associated with an increased risk for acute coronary syndrome (ACS), stroke and death in a new research.

The study revealed that patients with MS had a 28% increased risk for ACS, a 59% increased risk for CVD, and a 32% increased risk for any macrovascular disease compared to matched healthy controls. The findings were published online in *JAMA Neurology*.

IL-17A Blockers Beneficial in Spine Disease

Inhibition of interleukin (IL)-17 seems to be an effective and safe option for the treatment of ankylosing spondylitis, reported a meta-analysis of six randomized clinical trials.

Around 57.6% of patients receiving secukinumab or ixekizumab met the primary endpoint of a 20% improvement on the criteria of the Assessment of Spondyloarthritis International Society (ASAS20) at week 16, compared to 35.3% of those given placebo, for a risk ratio of 1.63, reported researchers in *Arthritis Research & Therapy*.

MAPIAN Gains Fame as Young Astronomer

Nikhil Jha, 14-year-old student of class X of Mount Abu Public School, Rohini, Sector 5, Delhi, India has discovered an asteroid in the "All India Asteroid Search Campaign", held in July-August, 2019. It was a global level search campaign by the International Astronomical Search Collaboration (IASC), and in India, by SPACE, which conducts this campaign across India, in association with International Astronomical Search Collaboration (IASC), conducted by Dr. Patrick Miller of Hardin-Simmons University, the USA, as an educational outreach program. All India Asteroid Search Campaign is a unique and exclusive International platform created by SPACE for Indian students and amateur astronomers across India since 2010.

This provisional discovery of asteroid marks one of the best achievements for Mount Abu Public School as asteroids are hard to search for and needs dedication and continuous efforts. The discovery of asteroid by the young student is a clear reflection of the ideology that youth of today is indeed the change maker.

Ms Jyoti Arora, Principal of the school, appreciates the achievement of the young MAPIAN as she believes that it is the innovative bent of mind that makes a student a little different and unique among others.

CMAAO, HCFI and Medtalks Congratulate Nikhil Jha for his Achievement

Guidelines for RT-PCR Based Pool Sampling of Migrants, Returnees from Abroad

The government has decided on using one time RT-PCR based pooled sampling for COVID-19 screening among migrant workers and people returning from abroad kept in quarantine facilities.

The same technique would also be used for monitoring in green zone districts which have reported no cases till now or over the last 21 days, said the Union Health Ministry as it issued 'Guidelines for RT-PCR based pooled sampling for migrants/returnees from abroad/ green zones' recently. According to the guidelines, a cohort of 25 people will be identified, and throat/nasal swab will be collected according to the stated protocol, by trained laboratory personnel wearing appropriate protective gear including apron, hand glove, face-shield/goggles and N-95 mask… (*ET Healthworld – PTI*)

Modify Risk Factors to Manage ICU Delirium in Patients with COVID-19

COVID-19 patients treated in intensive care units have a heightened risk of delirium. A bedside risk management strategy that is based on modifiable risk factors can help prevent lasting effects on cognition, suggests an article published in *Critical Care*.

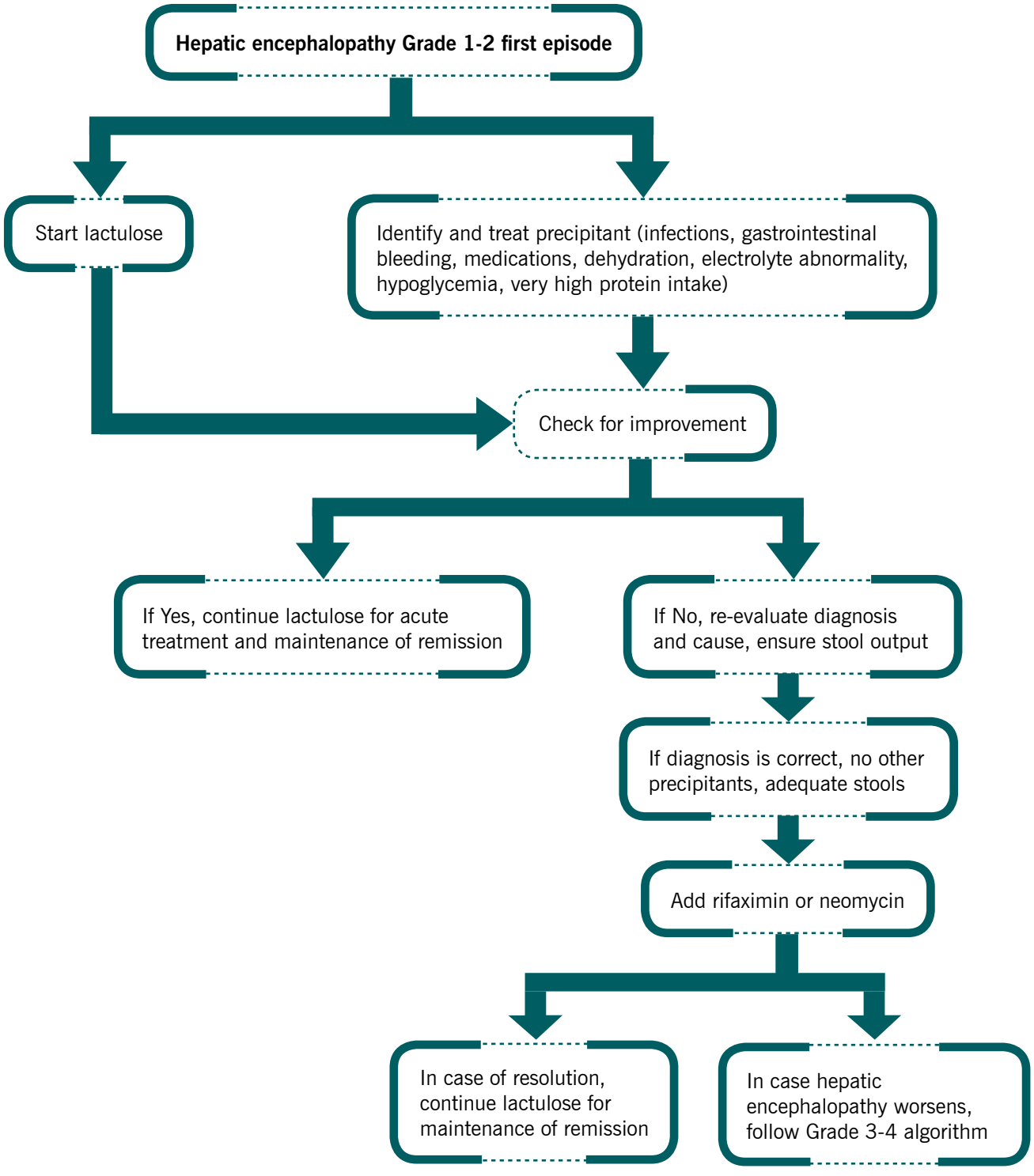
Investigators stated that several factors can contribute to an increased risk of ICU delirium in COVID-19 patients. Delirium in the context of COVID-19 could be an early sign of infection. The patients should, therefore, be screened using dedicated psychometric tools, stated researchers… (*Medscape*)

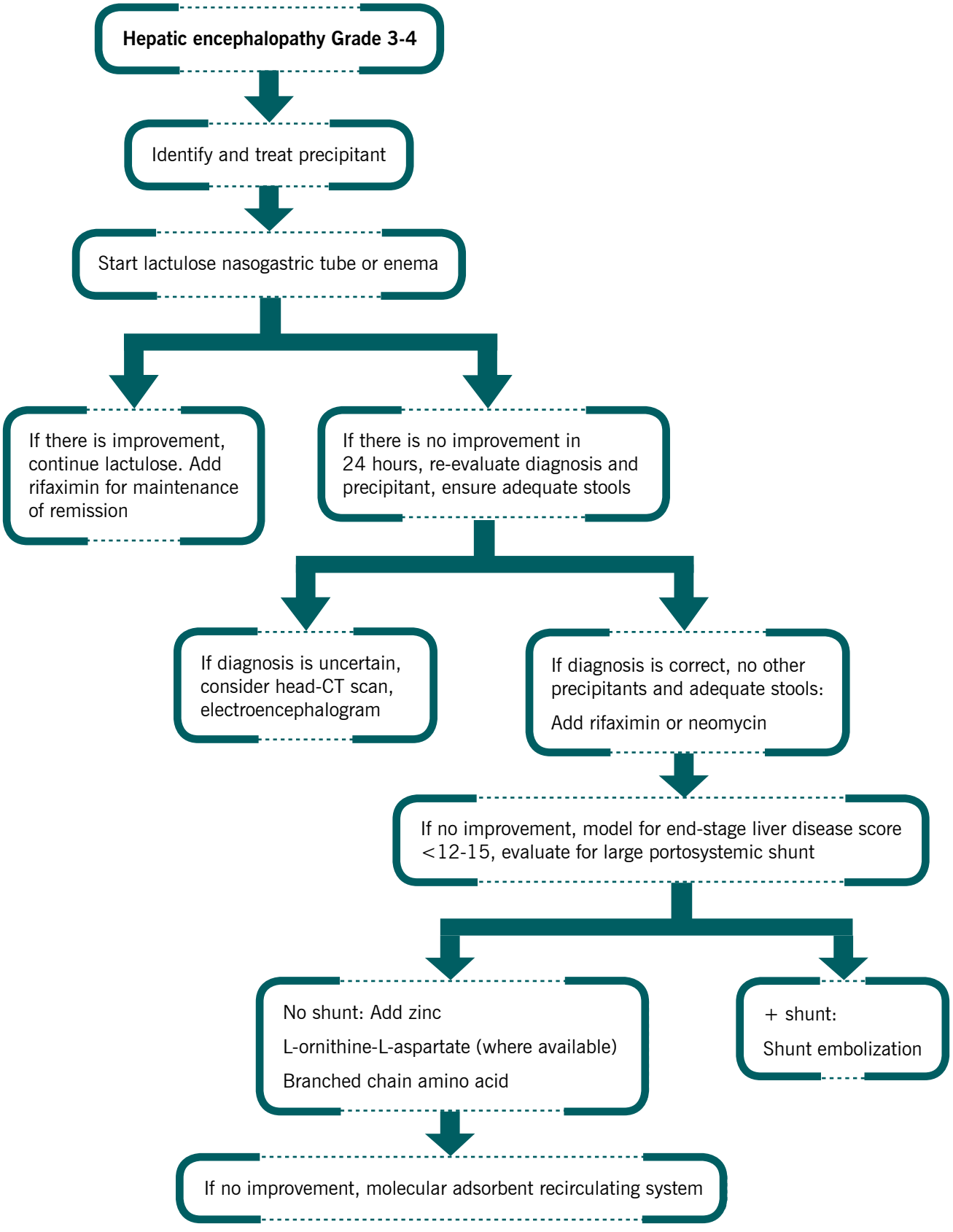
Substantial Investment Needed to Prevent Mental Health Crisis

The need to urgently enhance the investment in services for mental health has been brought to light by the ongoing COVID-19 pandemic, states a policy brief on COVID-19 and mental health issued by the United Nations.

"The impact of the pandemic on people's mental health is already extremely concerning," said Dr Tedros Adhanom Ghebreyesus, Director-General of the World Health Organization. "Social isolation, fear of contagion and loss of family members is compounded by the distress caused by loss of income and often employment." There are reports of a rise in symptoms of depression and anxiety in several countries…(*WHO*)

Management of Hepatic Encephalopathy





Adapted from Leise MD, Poterucha JJ, Kamath PS, et al. Management of hepatic encephalopathy in the hospital. Mayo Clin Proc. 2014;89(2):241-53.

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Types of Memory

KK AGGARWAL

The easiest way to remember types of memory is by understanding the concept of *Suno, Samjho, Jano and Karo* (hearing, listening, knowledge and wisdom). Hearing is the shortest lasting memory. We hear and we forget is the rule.

Once we listen and understand, the memory is longer lasting but the same memory becomes everlasting if we not only hear, understand and know but also incorporate the knowledge in our practice.

These principles have been used by marketing people in brand recall. I know many pharmaceuticals play a game and ask 100 doctors to enter into a competition in which they have to write the company's brand a number of times in 1 minute and the one who writes the maximum number of times is given a prize. By repeatedly writing the brand name, you create a permanent impact of their brand in the soul and it is unlikely that you will forget the brand and its recall value will increase every time you think about the molecule.

The same principle has been used by devotees of Rama and Shiva where they ask people to write the name of Rama repeatedly every day and the devotees of Shiva make people write Om Namaha Shivaya on a piece of a paper for years together. By doing so you inculcate the teachings of Lord Rama and Shiva.

Many spiritual Gurus give a Mantra, which is also based on the same principle. A mantra is nothing but a positive affirmation which you have to follow every minute of your life throughout your life. Once you start doing it, a time will come when it will become a part of your sole consciousness and you will start living and behaving in a way as of your positive affirmation. For example, Brahma Kumaris say that always say a positive affirmation to yourself that I am a peaceful soul. After some time you will start behaving like a peaceful soul and you will lose agitation, anger and negative affirmations of life.

(Disclaimer: The views expressed in this write up are my own).

Group Editor-in-Chief, IJCP Group

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Evidence on Spironolactone Safety, COVID-19 Reassuring for Acne Patients

Concerns have been raised about potential risks with the use of spironolactone for acne during the COVID-19 pandemic on social media; however, spironolactone and other androgen blockers might actually protect against the virus, suggests a report published in the *Journal of the American Academy of Dermatology*.

The virus needs androgens to infect cells, and uses androgen-dependent transmembrane protease serine 2 to prime viral protein spikes to anchor onto ACE2 receptors. In the absence of this step, the virus is not able to enter the cells. Androgens are the only known activator in humans, so androgen blockers like spironolactone could possibly short-circuit the process, state lead author Carlos Wambier, MD, PhD, of the Department of Dermatology at Brown University, Providence, RI (*J Am Acad Dermatol.* 2020 Apr 10.).

The lack of androgens could possibly explain why mortality is so rare among children and why fatalities among men are higher than among women. At least one study is currently ongoing to see if spironolactone is beneficial: 100 mg twice a day for 5 days is being pitted against placebo in Turkey among people hospitalized with acute respiratory distress. The study will evaluate the effect of spironolactone on oxygenation.

Weakness or Strength?

Sometimes our biggest weakness can become our biggest strength. Take, for example, the story of one 10-year-old boy who decided to study Judo despite the fact that he had lost his left arm in a devastating car accident.

The boy began lessons with an old Japanese Judo master. The boy was doing well, so he couldn't understand why, after 3 months of training the master had taught him only one move.

"Sensei," the boy finally said, "Shouldn't I be learning more moves?"

"This is the only move you know, but this is the only move you'll ever need to know," the sensei replied.

Not quite understanding, but believing in his teacher, the boy kept training.

Several months later, the sensei took the boy to his first tournament. Surprising himself, the boy easily won his first two matches. The third match proved to be more difficult, but after some time, his opponent became impatient and charged; the boy deftly used his one move to win the match. Still amazed by his success, the boy was now in the finals.

This time, his opponent was bigger, stronger and more experienced. For a while, the boy appeared to be overmatched. Concerned that the boy might get hurt, the referee called a time-out. He was about to stop the match when the sensei intervened.

"No", the sensei insisted, "Let him continue."

Soon after the match resumed, his opponent made a critical mistake: he dropped his guard. Instantly, the boy used his move to pin him. The boy had won the match and the tournament. He was the champion.

On the way home, the boy and sensei reviewed every move in each and every match. Then the boy summoned the courage to ask what was really on his mind.

"Sensei, how did I win the tournament with only one move?"

"You won for two reasons", the sensei answered. "First, you've almost mastered one of the most difficult throws in all of Judo. And second, the only known defense for that move is for your opponent to grip your left arm."

The boy's biggest weakness had become his biggest strength.

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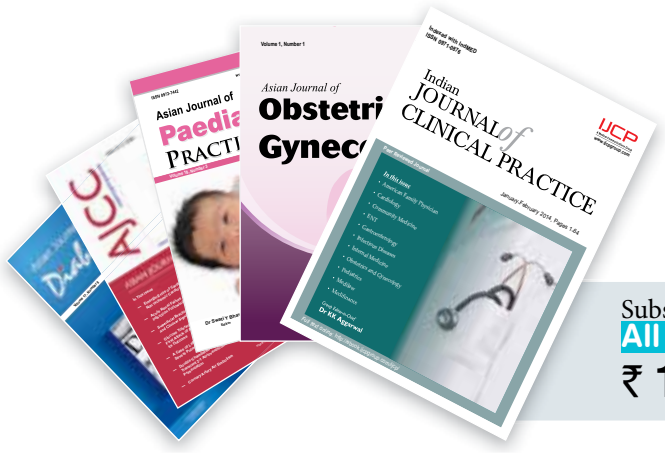
Monoclonal Antibodies

The use of monoclonal antibodies (mAbs) directed against infectious pathogens is an area of investigation. The mechanism is not completely understood. Potential uses include prevention or treatment of specific infections. Most mAbs target proteins on the surface of a virus and neutralize the virus from entering cells. Palivizumab is an antibody against the respiratory syncytial virus (RSV) fusion (F) glycoprotein. It inhibits viral entry into host cells. The therapy got US FDA approval for the prevention of RSV infection. Other investigational preventive antiviral mAbs include those that target the conserved hemagglutinin A stem of *Haemophilus influenzae*. This therapy may help in cases in which vaccination offers ineffective humoral immunity.

Investigational mAbs against HIV can improve immunity during active infection, with promising results in animal models using broadly neutralizing antibodies. Some mAbs against bacteria can function both prophylactically and therapeutically, for instance, by targeting the protective antigen domain of *Bacillus anthracis* or one of the *Clostridioides* [formerly *Clostridium*] *difficile* toxins). A 2018 editorial stated that mAbs directed against pathogens are unlikely to be used routinely owing to their high cost and requirement for parenteral administration; however, they may be especially useful for certain emerging infectious diseases. Treatment of active disease and/or targeted prophylaxis might be important in individuals who have not been vaccinated against a pathogen but require immediate protection (those infected with Ebola virus, pregnant women residing in Zika virus-endemic areas and COVID-19). (*UpToDate*)



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Lighter Side of Medicine

HUMOR

EYE SURGERY

While my friend was working as a receptionist for an eye surgeon, a very angry woman stormed up to her desk.

"Someone stole my wig while I was having surgery yesterday," she complained.

The doctor came out and tried to calm her down. "I assure you that no one on my staff would have done such a thing," he said. "Why do you think it was taken here?"

"After the operation, I noticed the wig I was wearing was cheap-looking and ugly."

"I think" explained the surgeon gently, "that means your cataract operation was a success."

SMART KID

So little Johnnie comes home with his report card for 5th grade, and shows it to his mother. His mom reads the report card and gets more and more upset as she sees his grades. "Johnnie, you have 5 "F's" and a "D" in Math! Wait until your Father sees this!"

So Johnnie's dad comes home from his job at the lab, looks the report card over thoughtfully. Johnnie's Mom says, "Well, aren't you going to say SOMETHING to him??"

Johnnie's dad pulls him aside, and says, "Son, I think you are putting too much time and effort on your Math."

TALKING CLOCK

While proudly showing off his new apartment to friends late one night, the drunk led the way to his bedroom where there was a big brass gong.

"What's that big brass gong for?" one of the guests asked.

"Why, that's the talking clock", the man replied.

"Watch", the man said, giving the gong an ear-shattering pound with a hammer.

Suddenly, someone on the other side of the wall screamed, "F'gosh sakes, you idiot, it is 2 am in the blanket-blank morning!"

KEYBOARD

Customer: My keyboard is not working anymore.

Tech support: Are you sure it's plugged into the computer?

Customer: No, I can't get behind the computer.

Tech support: Pick up your keyboard and walk 10 paces back.

Customer: Ok.

Tech support: Did the keyboard come with you?

Customer: Yes.

Tech support: That means the keyboard is not plugged in. Is there another keyboard?

Customer: Yes, there's another one here. Ah...that one does work.

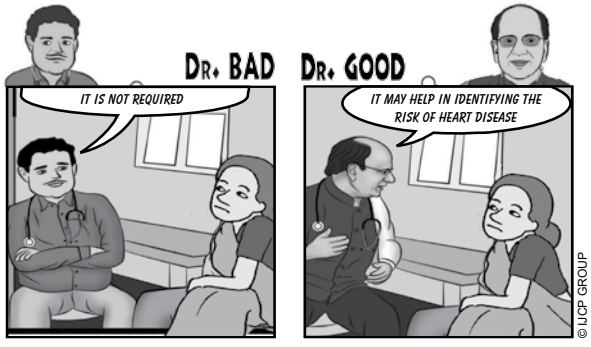
CAN'T FIND PRINTER

Customer: Hi, good afternoon, this is Martha, I can't print. Every time I try, it says 'Can't find printer'.

I've even lifted the printer and placed it in front of the monitor, but the computer still says he can't find it…

Dr. Good and Dr. Bad

SITUATION: A 57-year-old woman with type 2 diabetes from the past 12 years was advised assessment of coronary artery calcium score to identify the risk of CHD or ASCVD.



LESSON: A large multiethnic cohort study revealed that coronary artery calcium score appears to be a prognostic indicator of CHD and ASCVD in people with diabetes or metabolic syndrome, even if the duration of diabetes is over a decade. This suggests a role of this score in risk assessment in these patients.

JAMA Cardiol. 2017;2(12):1332-40.

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Padma Shri Awardee
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- Method of allocating the subjects into different groups.
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- These should be concise and include only the tables and figures necessary to enhance the understanding of the text.

Discussion

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References

These should conform to the Vancouver style. References should be numbered in the order in which they appear in the texts and these numbers should be inserted above the lines on each occasion the author is cited (Sinha[12] confirmed other reports[13,14]...). References cited only in tables or in legends to figures should be numbered in the text of the particular table or illustration. Include among the references papers accepted but not yet published; designate the journal and add 'in press' (in parentheses). Information from manuscripts submitted but not yet accepted should be cited in the text as 'unpublished observations' (in parentheses). At the end of the article the full list of references should include the names of all authors if there are fewer than seven or if there are more, the first six followed by et al., the full title of the journal article or book chapters; the title of journals abbreviated according to the style of the Index Medicus and the first and final page numbers of the article or chapter. The authors should check that the references are accurate. If they are not this may result in the rejection of an otherwise adequate contribution.
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Articles

Paintal AS. Impulses in vagal afferent fibres from specific pulmonary deflation receptors. The response of those receptors to phenylguanide, potato S-hydroxytryptamine and their role in respiratory and cardiovascular reflexes. Q. J. Expt. Physiol. 1955;40:89-111.

Books

Stansfield AG. Lymph Node Biopsy Interpretation Churchill Livingstone, New York 1985.

Articles in Books

Strong MS. Recurrent respiratory papillomatosis. In: Scott Brown's Otolaryngology. Paediatric Otolaryngology Evans JNG (Ed.), Butterworths, London 1987;6:466-470.

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