

PART 1

Summer Training

ReportBy

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Acknowledgement

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Abbreviations

ACE2	Angiotensin converting enzyme 2
AIDS	Acquired immune deficiency syndrome
CBC	Complete blood count
CDC	Centres for Disease Control and Prevention
COVID-19	Corona virus diseases 19
CPCB	Central Pollution Control Board
CRP	Cardio pulmonary resuscitation
CT scans	Computed tomography
DCHC	Dedicated COVID Health Centre
FAO	Food and Agriculture Organization of the United Nations
FGF2	Fibroblast growth factor
GCSF	Granulocyte colony-stimulating factor
GDP	Gross domestic product
GMCSF	Granulocyte-macrophage colony-stimulating factor
HCoV	seven human coronaviruses
HCQ	Hydroxychloroquine
HIV	Human immune virus
ICD	International Classification of Diseases
ICTV	International Committee on Taxonomy of Viruses
IFN	Interferon
IL	Interleukin
IUFD	intrauterine feecal demise
IUGR	intrauterine growth restriction
KFT	Kidney function test
LFT	Liver function test
MCP	Membrane cofactor protein
MERS-CoV	Middle east respiratory syndrome coronavirus
MIP	Macrophage inflammatory protein
OIE	World Organisation for Animal Health
PCR	Polymerase chain reaction

PDGF	Platelet-derived growth factor
PPE	Personal protective equipment
PROM	premature rupture of membranes
PTL	preterm labor
RNA	Ribonucleic acid
rRT-PCR	reverse real-time PCR
SARS-CoV	Severe acute respiratory syndrome coronavirus
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
TBF	Tumour necrosis factor
VEGFA	Vascular endothelial growth factor
WHO	World health organisation

An Extensive Review on Outbreak of COVID-19

Chapter - 1

Introduction

The present review is carried out to identify, analyse and to forecast the future prospects of the COVID-19 global outbreak, and also to address the root causes and extensivity of the outbreak. I have collected the peer reviewed articles on the corona virus from the reputed journals and which are studied extensively to stipulate the description for coronavirus disease, its classification and origin, transmission, pathogenesis, epidemiology, symptoms, diagnosis, management and measures to control the community spread. The secondary data from the articles was considered in writing this report; my intuitions were also noted as an interpretation towards the available data.

Objectives

The following are the objectives of the present study

- a. To identify the best approach to curb the infection.
- b. To rule out all the available possibilities of the pandemic occurrence
- c. To learn transmission, pathogenesis, epidemiology
- d. To understand the prevention, management

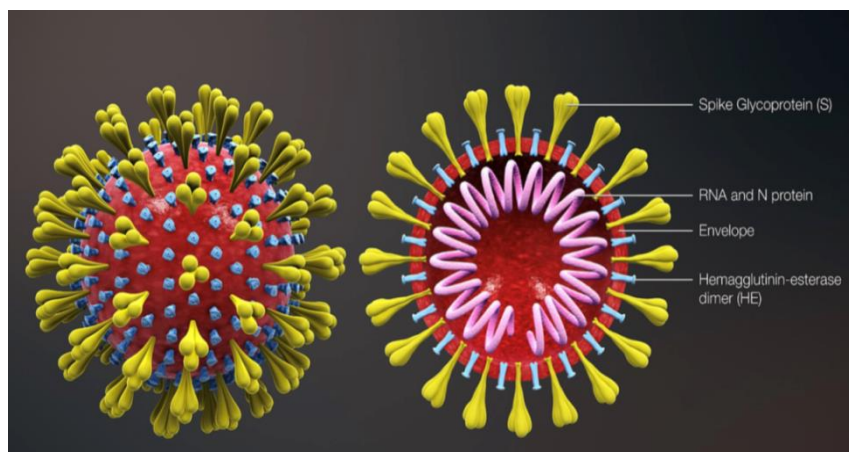


Fig 1: COVID-19 structural representation

Chapter –2

Methodology

Study Design: Descriptive

Study Rationale Question: To describe comprehensively about the COVID 19 occurrence, spread, symptoms, management and prevention?

Study Duration: 2 months, from 20th April 2020 to 20th June 2020

Source of Data Collected: Secondary data, peer reviewed journals and articles

Samples Collected: 23 peer reviewed articles, reports and journals specific to COVID-19 and SARS Cov.

Data Collection Procedure: The secondary data is collected through the available peer reviewed journals between December 2019 and April 2020.

Inclusion Criteria: The articles, journals and reports published between December 2019 and April 2020 for the evaluation of COVID-19 and the articles, journals, reports and website content published since 2012 for the evaluation of SARS CoV

Data Analysis: Comprehensive review of the secondary data, refining and collecting the specific data necessary to prepare the report.

Study Procedure:

Step 1: Identification of the research question

Step 2: Research to find the available secondary data required for the research in question and Selection of the scientific articles, magazines and news articles etc.,

Step 3: Detailed review of the data selected and analysing the data information and selecting the essential points and thereby writing the report

Chapter –3

Data Compilation

3.1 THE VIRUS: Classification and origin:

SARS-CoV-2 goes to the intimate of Coronaviridae in the order of Nidovirales. It consists of 2 subfamilies, such as Coronavirinae, Torovirinae and again divided into four genera: (a) Alphacoronavirus covers the human coronavirus; (b) Betacoronavirus includes, Middle Eastern respiratory syndrome coronavirus (MERS-CoV) and Severe; (c) Gammacoronavirus has viruses of birds and whales; (d) Deltacoronavirus comprises isolated from birds and pigs, SARS-CoV-2 it fit in to Betacoronavirus collected with 2 very pathogenic viruses, such as MERS-CoV and SARS-CoV. Corona is an wrapper and virus with the presence of positive-sense single-stranded RNA ^(1, 2).

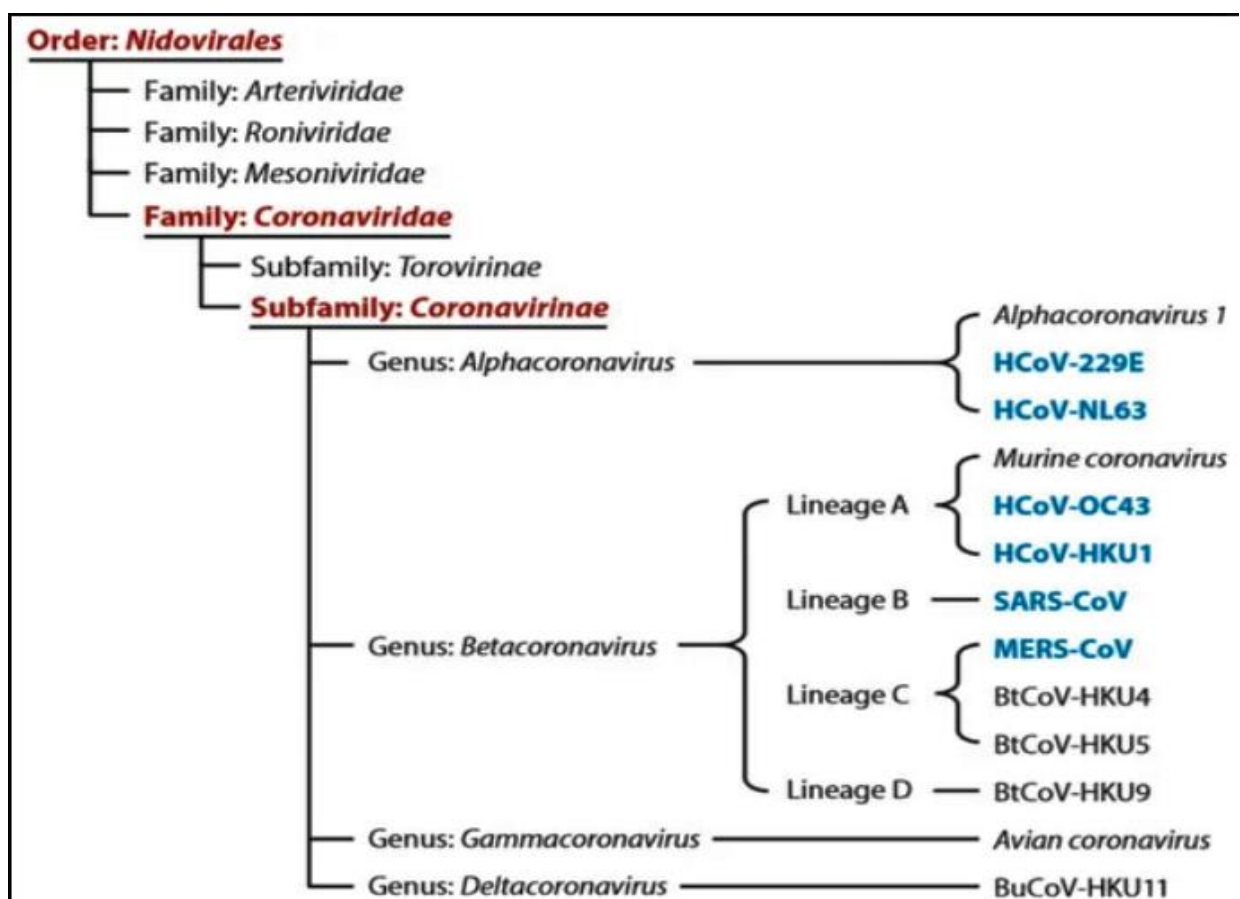


Fig 2: COVID-19 family classification

Corona virus is measured as a new Beta coronavirus contaminating humans. Phylogenetic examination of corona virus genome specifies that virus is strictly connected (identity88%) to 2 bat-origin SARS-like virus composed in 2018 at eastern China besides hereditarily separate from SARS-CoV (similarity79%) also MERS-CoV. By the genome arrangements of the RaTG13, SARS-CoV and SARS-CoV-2 with the further learning's of the virus is further connected to CoV RaTG13 (Bat). A reading institute that have no indication of recombination noticed in genome of the corona with other viruses initiating after bats like SARSr-CoVsBatCoV, SARS-CoV andRaTG13. Overall, these results propose that the bats perhaps the real host for virus^(3 &4).

3.2 COVID-19 Transmission:

The part of Huanan Sea-food General Marketplace in the spreading of the disease is indistinct. Numerous early cases were related to the marketplaces ignifying that the virus was spread from the animals to the human beings. Though, a genomic learning has been delivered the facts that virus might presented from another but unknown place, into marketplace where then it blow-out more fast, while human-to-human diffusion might have had happened previously.

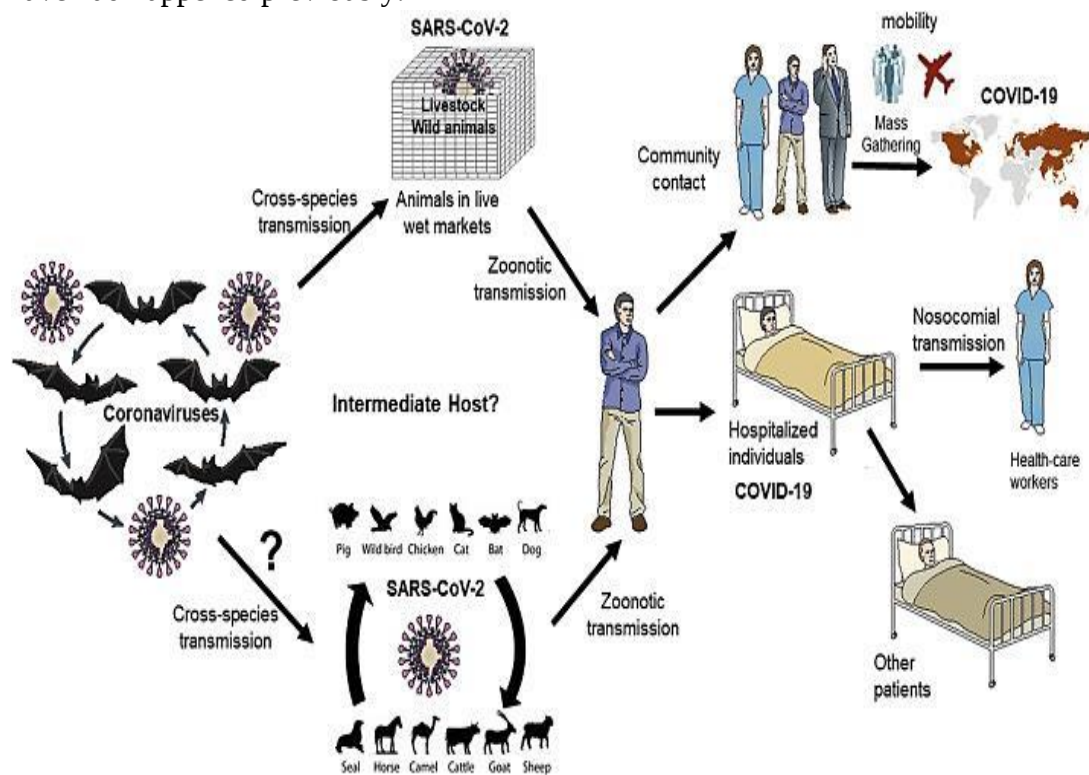


Fig 3: COVID-19 Transmission

Bunches of diseased family associates with medical employees have been established with the occurrence of transmission from person-to-person. Post 1 of January patients less than 10% have marketplace contact and a lot of patients' accounts for 70% have no contact with the marketplace. Transmission from human to human has been considered to take place between related persons through droplets infection. Fomites might have been the large carriers of the infection as these found to last on exteriors until 96 hours and some other until 9 days. ⁴

3.3 COVID-19 Pathogenesis:

Pathogenesis is demarcated as beginning and expansion of a disease in the body. Visions into disease causes and expansion, 2severe features of pathogenesis, are supreme in prevention, treatment and management of a disease.

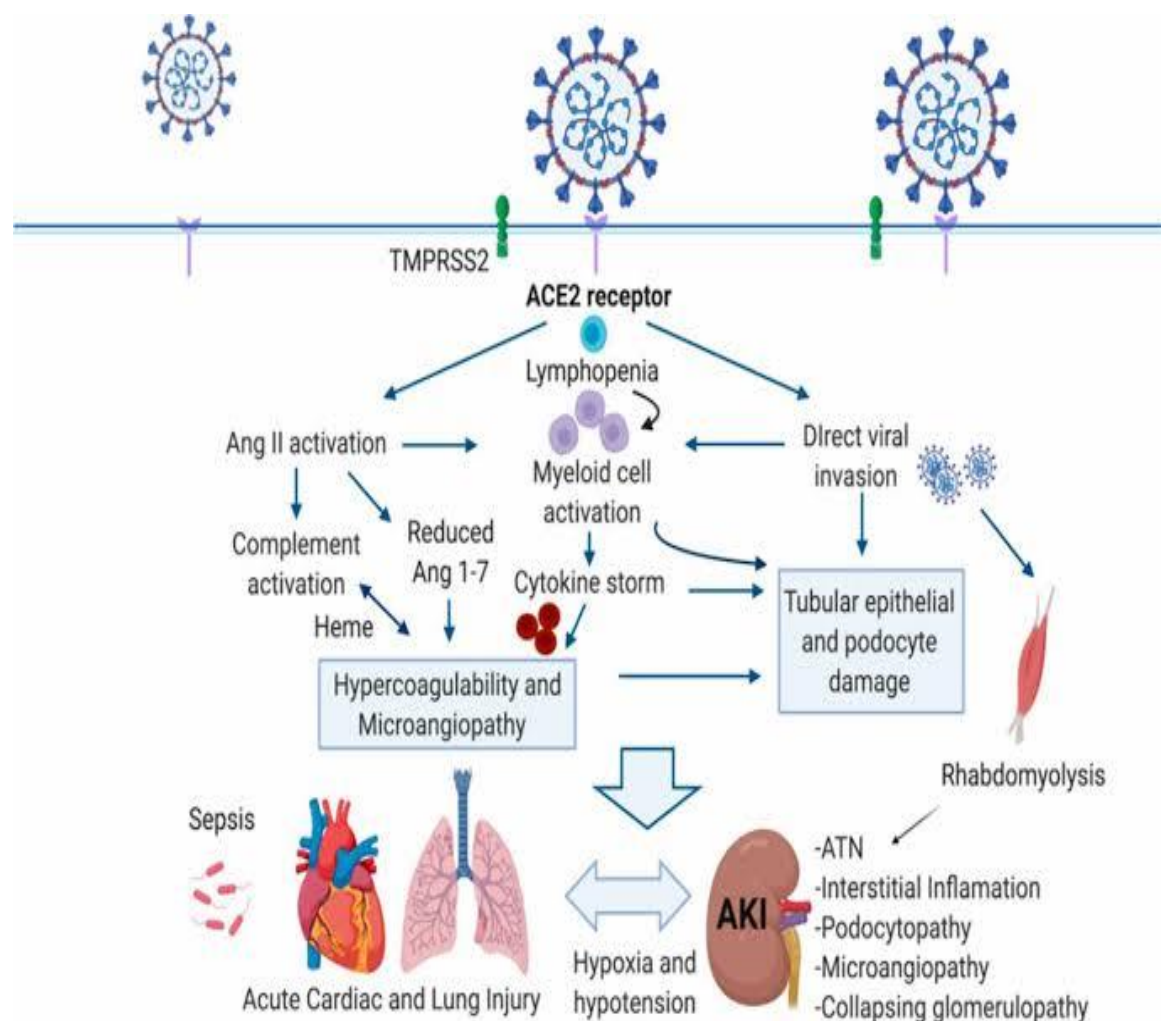


Fig 4: COVID-19 Pathogenesis

Suggestively great levels of chemokines and cytokines in blood are identified in the patients who have Covid contamination which included IL1RA, IL1- β , IL8, IL7, IL10, IL9 and the basic GCSF, IFN γ , FGF2, GMCSF, MCP1, IP10, MIP1 β , PDGFB, MIP1 α , VEGFA and TNF α . Serious cases which were known to ICU presented great points for pro-inflammatory cytokines that are coherent with promoting the disease extensivity⁵.

3.4 COVID-19 Epidemiology:

In common, the appearance of the communicable disease includes 3 dynamics essentials: susceptible population, transmission route and infectious source. Now, virus effected patients are the prime basis of contamination, creating a great amounts of virus in respiratory tract (upper). Because of slight clinical signs throughout the development period, patients can continue movable and take part in the daily activities, primary to the blow-out of the contamination. Asymptomatic transporters can also behave as a basis of contagion.

The development stage of the disease is noted as 1 to 14 days, normally 3 to 7 days, and can hike to 24 days, creating problematic to diagnose the spread and infections. Moreover, the virus is mostly spread by respirational dews and interaction. Infections between the 14 health employees established the disease's great contagion and elevated worries about people perhaps "super spreaders". In comparatively locked atmospheres, aerosol communications may occur⁶

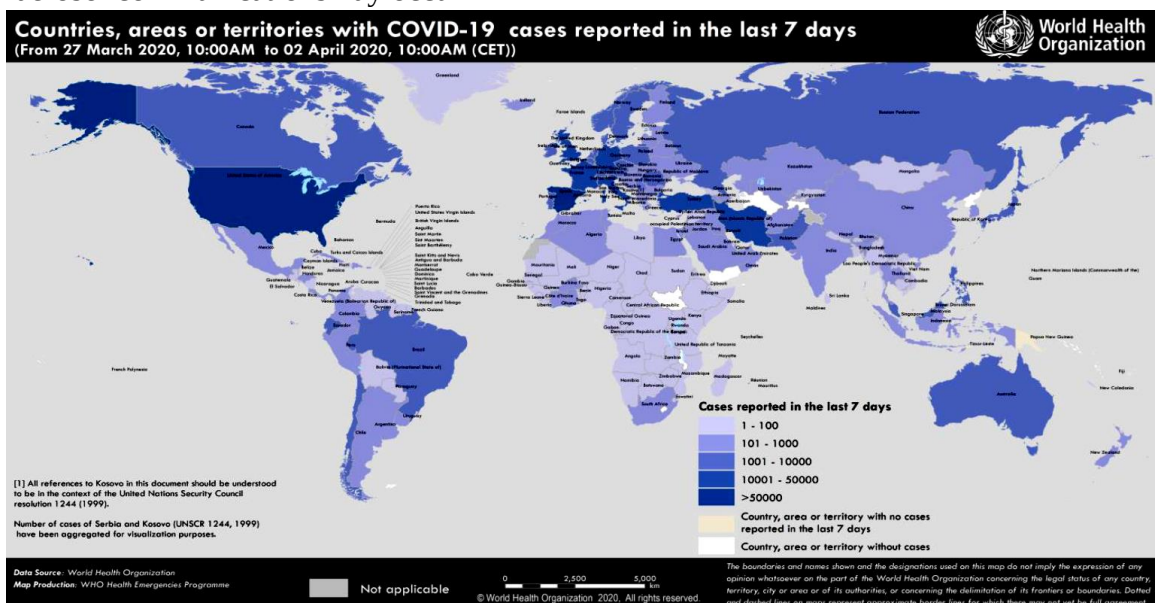


Fig 5:2 April 2020, Countries, with established COVID-19 cases

Hospital transmission is also a great risk. Until February 12, 2020, a whole of 3,019 medical employees have been infected with virus, and calculated for 3.83% of the entire amount of contagions. Personal protective equipment (PPE), counting fluid resilient gown, eye protection, full face shield, fit-tested N95 respirators and gloves are necessary to increase the care of medical employees.

A new study establishes that virus could be identified in human tears and eye secretions of patients with conjunctivitis; this proposes that optical infection perhaps be the cause of transmission. The likelihood of feecal–oral spread also has to be measured, as virus-related nucleic acids have been originate in faecal illustrations and anal swabs from some patients.

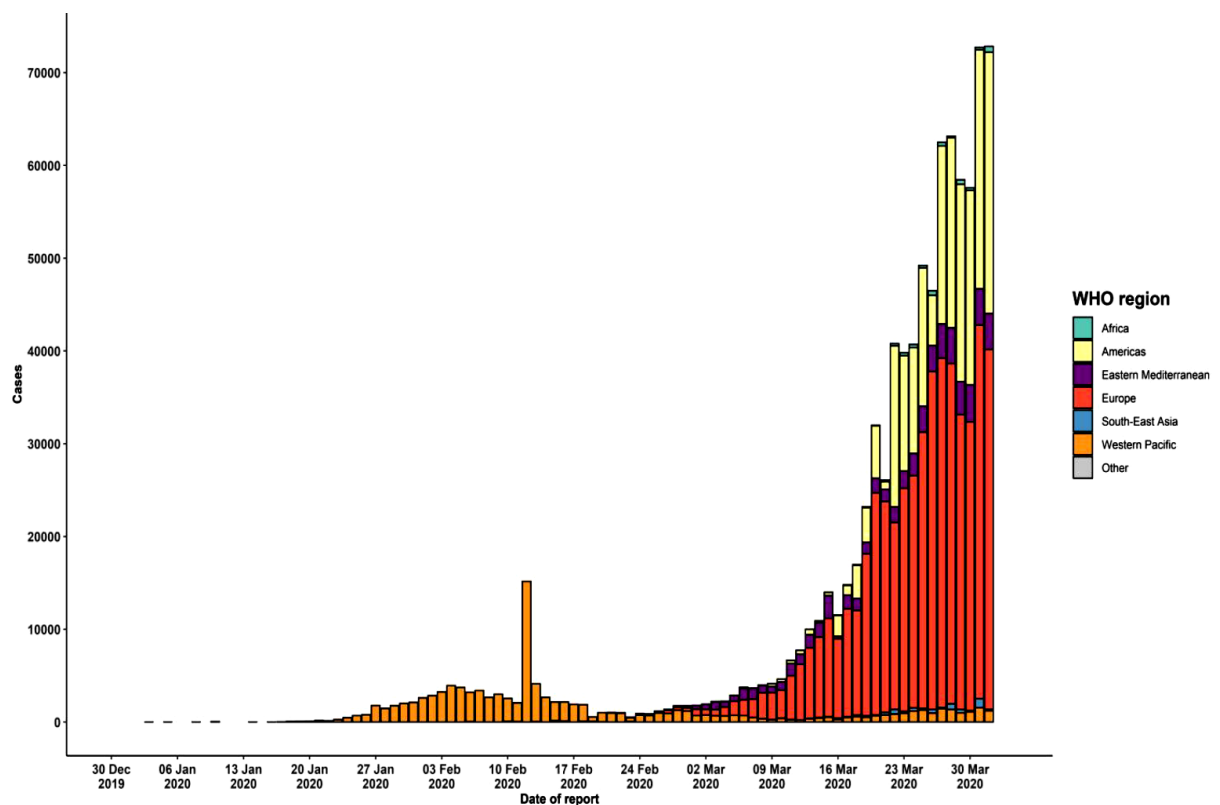


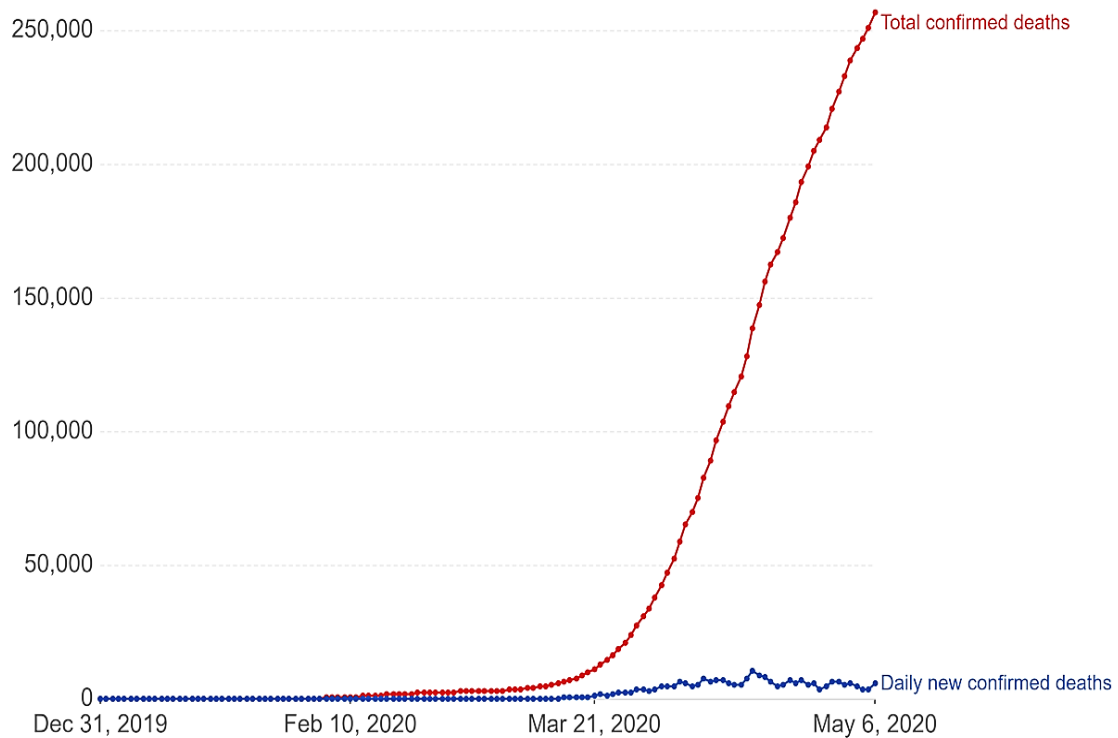
Fig 6: 2 April 2020, Epidemic curve of Cases Confirmed

On February 5, 2020, manifold television outlets are described that an infant conveyed by a woman with affirmative for virus in Wuhan has verified affirmative for the virus thirty hours after birth. There is presently no indication to propose that virus can endure intrauterine or Transplacental diffusion; though, when transporting a neonate from an diseased patient, neonatologists should dress appropriate protective apparatus. Furthermore, the new-borns should be separated as early as they are supposed of being diseased.

Daily and total confirmed COVID-19 deaths, World

Limited testing and challenges in the attribution of the cause of death means that the number of confirmed deaths may not be an accurate count of the true number of deaths from COVID-19.

Our World
in Data



Source: European CDC – Situation Update Worldwide – Last updated 6th May, 11:15 (London time)

OurWorldInData.org/coronavirus • CC BY

Fig 7: Death curve of COVID-19, by May 6, 2020

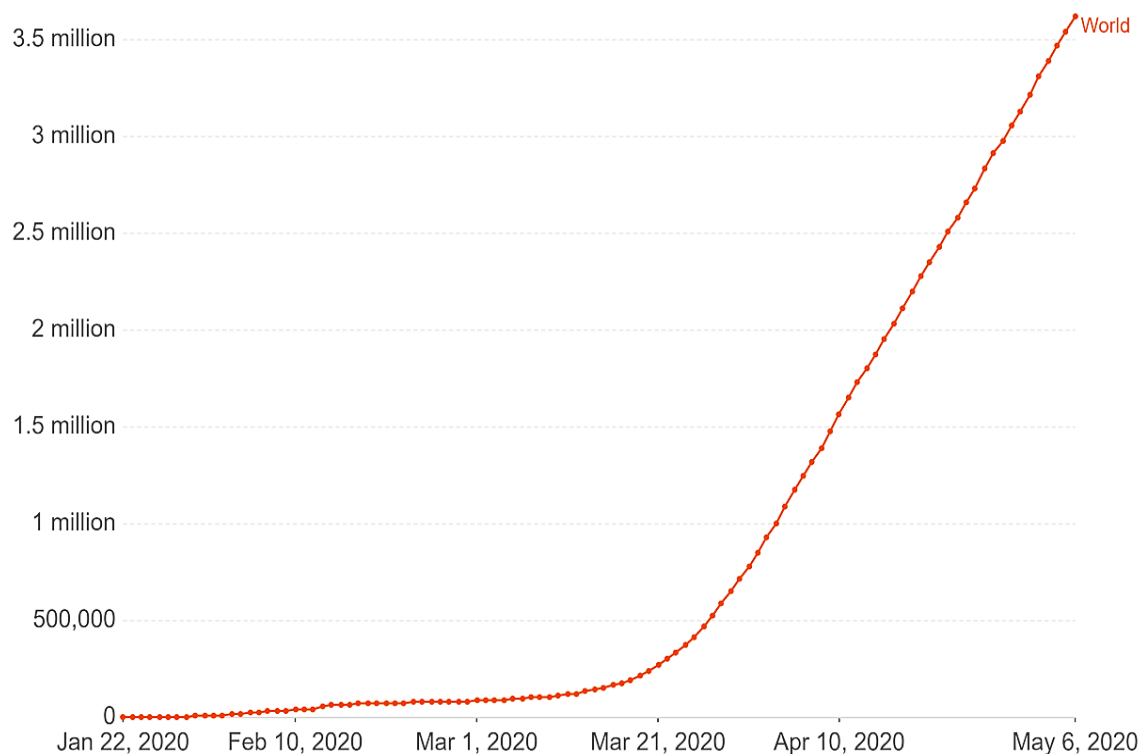
Though all inhabitants are vulnerable to virus, specific care and exertions to shield from spread must be fixed at susceptible sets like health care providers, elderly, children, and pregnant women. Until 2020, January 29, a course had gained information for the clinical signs and predictions for patients (1,099) who have been admitted at 552 hospital sites.

The average age remained 47 years; virus has produced great morbidity and mortality especially in elderly, particularly those have co-existing morbidities like diabetes and heart disease, this perhaps with the deteriorated immune arrangement that authorises a sooner development of the infection. Though children are probable for diseased by the virus as like the adults, children are fewer possible to experience for great signs, which propose the actions like school closings perhaps aid sluggish the blow-out of virus.

Total confirmed COVID-19 cases

The number of confirmed cases is lower than the number of total cases. The main reason for this is limited testing.

Our World
in Data



Source: European CDC – Situation Update Worldwide – Last updated 6th May, 11:15 (London time)

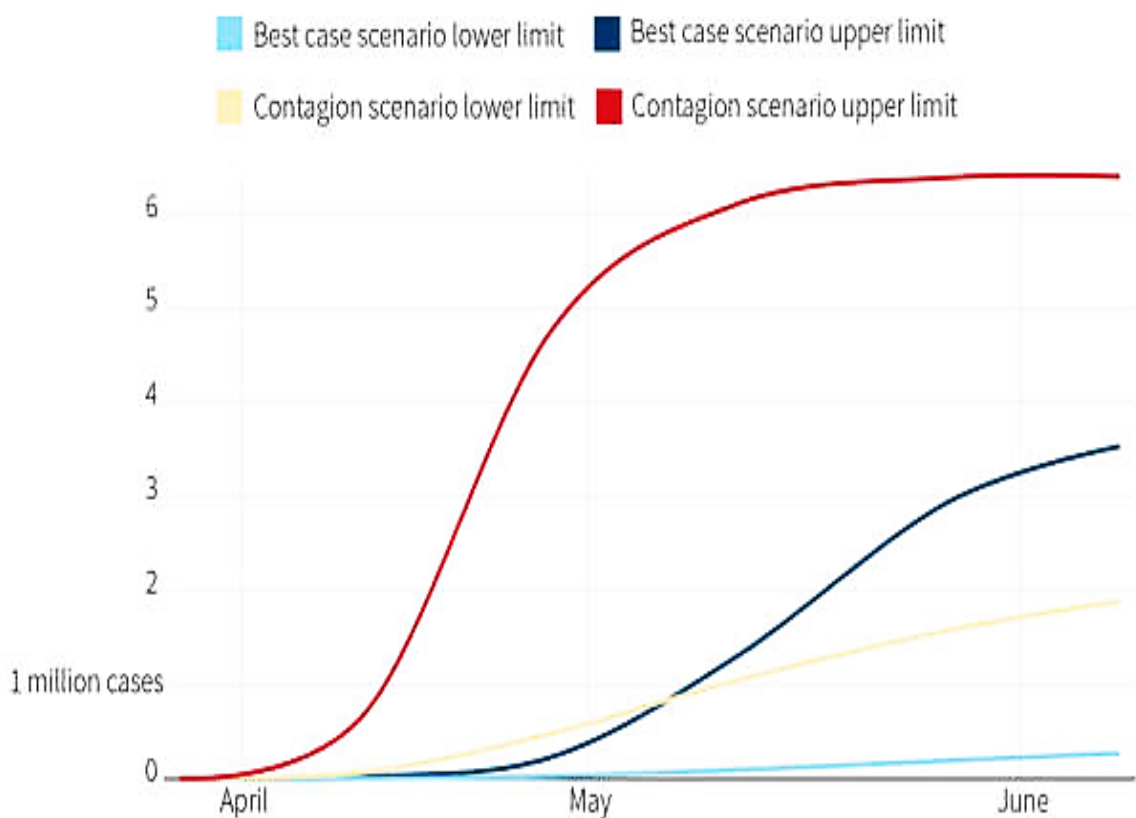
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Fig 8: Death curve of COVID-19, by May 6, 2020

The amount of prenatal females amongst established cases is little; yet, pregnant females are recognized designate chiefly vulnerable for lung pathogens and robust pneumonia. Also, the incidence of pneumonia throughout gestation can central to be numerous adversarial pregnant consequences, like early rupture of membranes, intrauterine foetal demise, intrauterine growth restriction, preterm labour and neonatal death, and so stances great dangers to both pregnant females and there to be born offspring.

Predicted cases of COVID-19 in India

By the end of April, India could see between around 30,000 and 230,000 confirmed COVID-19 cases, according to the team of biostatisticians and epidemiology experts, many of them from the University of Michigan.



Source: COV-IND-19 Study Group

Staff, 23/03/2020

REUTERS

Fig 9: COVID-19 Prediction in India

The death rate between pregnant females because of lung pathogens is greatly advanced than between normal persons; like, in the influenza pandemic (1918) reflected in 2.6% death rate, but 37% among gravid females. So, gravid females diseased with virus must be monitored in fitness care set up with near look. In this respect, involvements with illnesses related with other extremely pathogenic viruses also area applicable to corona, counting violent contagion regulator events, early isolation, empiric antibiotics, avoidance of fluid overload and oxygen therapy⁷.

3.5 Symptoms of COVID-19

- The symptoms of contagion look afterward a development age of 5 and half days. The age from start of indications to demise reached from six – forty-one days with an average of fourteen days.
- The greatest shared indication start of illness is cough, fever, fatigue, haemoptysis, dyspnoea, sputum production, diarrhoea, headache, and lymphopenia.
- Clinical structures revealed by a torso CT scan offered as pneumonia, though, there irregular structures for example severe cardiac injury, RNA aemia, occurrence of grand-glass opaqueness critical respirational distress syndrome and which leads to death.
- In certain instances, the manifold marginal ground-glass opaqueness remained detected in sub pleural areas of together lungs that probable persuaded together universal and local resistant reaction that leads with augmented swelling. Unfortunately, management of certain cases with the interferon breath showed zero scientific outcomes and in its place looked to degenerate the disorder through continuing pulmonary opaqueness.

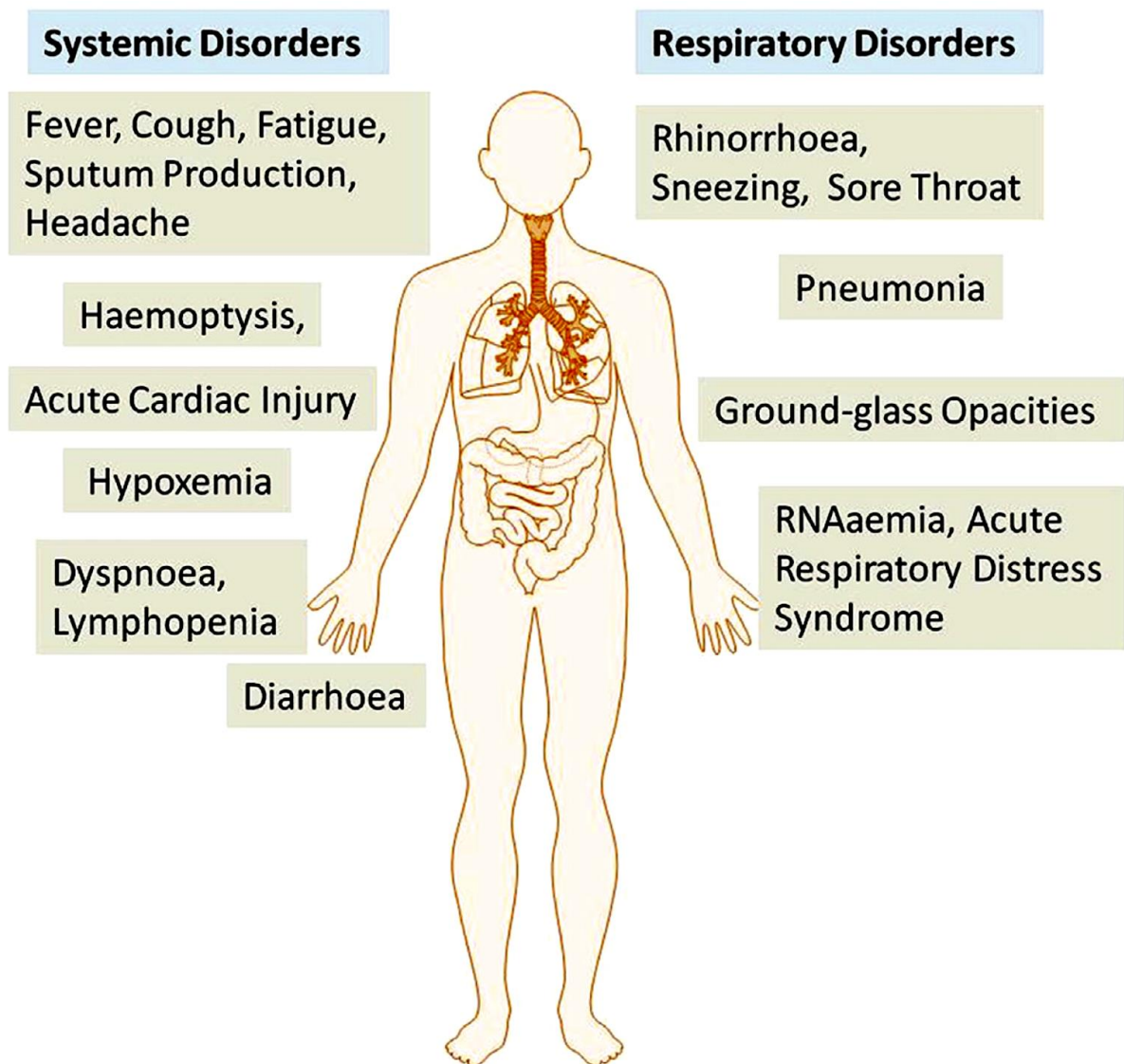


Fig10: Respiratory illnesses caused by COVID-19 infection.

It is significant near reminder here are resemblances in the indications among corona and former betacoronavirus for example dyspnea, dry cough, fever, and two-sided ground-glass opaqueness on the chest CT scans. Though, corona presented certain exclusive medical structures which comprise the directing of inferior airline as obvious through higher respirational region indications like sore throat, rhinorrhoea, sneezing etc.

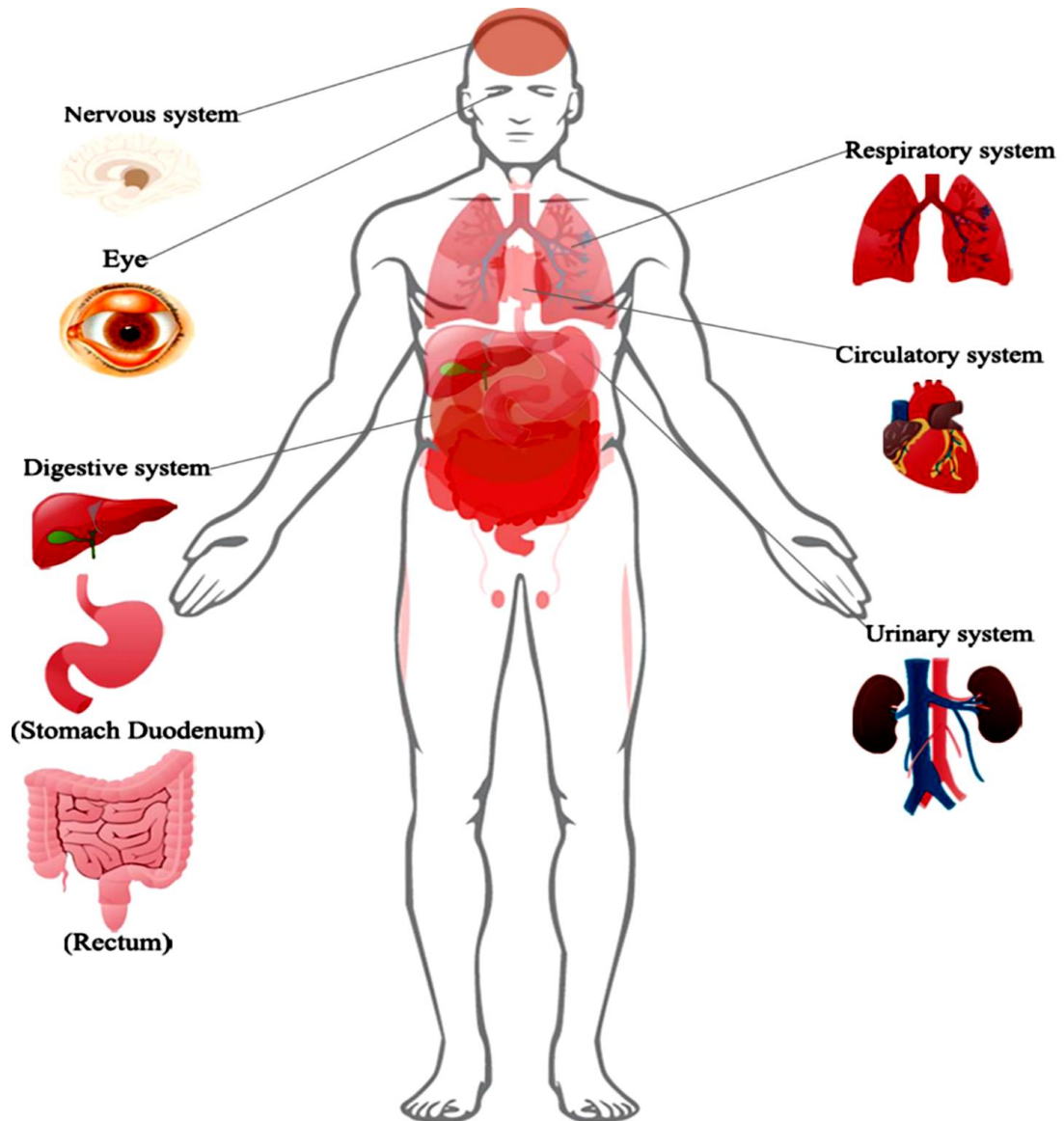


Fig 11: Organs Affected in patients with COVID-19.

In addition, founded on consequences from torso radiographs upon admittance, certain show penetrate in higher lung that is related with cumulative dyspnoea and hypoxemia. Highly, whereas patients diseased established gastrointestinal indications like diarrhoea, so, it is significant to check faecal, urine sections to reject a possible other course of communication, precisely over health employees. So, development of approaches to recognize the numerous styles of transmission like faecal and urine sections are immediately necessary in command to progress policies to constrain diffusion and then advance therapeutics to regulate from disease⁸.

3.6 Diagnosis(molecular) of SARS-CoV2:

Authorization of cases with suspected contagion is done through discovery of inimitable orders with nucleic acid intensification checks like reverse real-time PCR (rRT-PCR).

As quickly as on January 7, 2020, the Chinese healthiness establishments had professed that an original virus was accountable for eruption of pneumonia, the European net of theoretical and communal workshops aimed rRT-PCR procedure built on the judgment, arrangement of earlier existing SARS-CoV and bat linked disease genome arrangements as well as 5 orders resultant after the original corona virus made obtainable by Chinese establishments.

3 analyses were established. The first-line analyse marks the E gene indoctrination for wrapper protein, that is mutual with Sarbecovirus subgenus, whereas the additional precise analyse marks the RdRp gene indoctrination for RNA-dependent RNA polymerase. This analyse covers 2 inquiries: 1 probe, which responds with the SARS-CoV, SARS-CoV-2 RdRp gene, and the 2nd probe precise to corona. Finally, the 3rd supplementary analyse marks the nucleocapsid gene. This latter analyse remained not supplementary authenticated since it is marginally fewer subtle. This procedure remained accepted in additional than thirty European research laboratories.

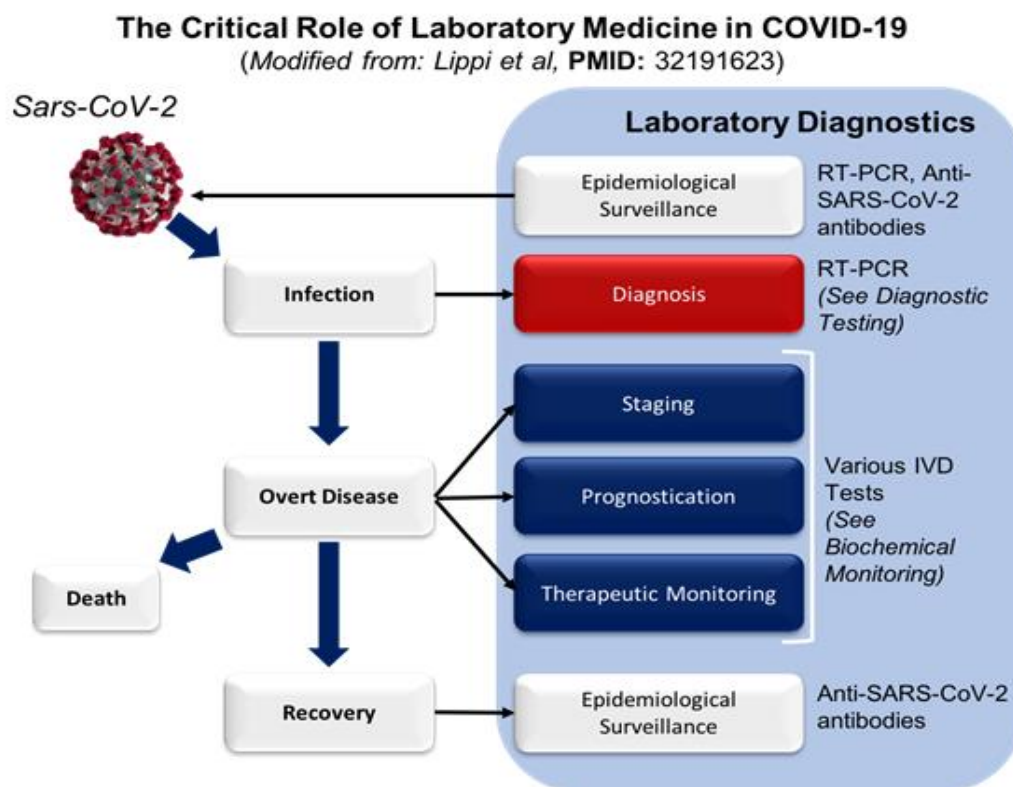


Fig 12: Laboratory Molecular Diagnostic process for COVID-19⁹.

Freshly, a new rRT-PCR assay directing a different area of the RdRp/Helgene of virus has been industrialized that presented a sophisticated sensitivity and specificity than RdRp-P2 analyse. Now, numerous intensification procedures are existing on the marketplace and authenticated aimed at in vitro analytical use: GeneFinder™ COVID-19 Plus RealAmpKitgenesig® Real-Time PCR Corona virus; Allplex™ 2019-nCoV

Analyse (Seegene, South Korea), etc. Vastly delicate and precise investigative analyses are important to the documentation of cases, interaction outlining, documentation the animal foundation, and application of regulator measures.



Fig 13: COVID-19 Rapid Kit by BioMedomics

When execution of nucleic acid intensification test analyses, valuable to retell ourselves that many issues can be accountable for a bad consequence in an diseased single, for example the deprived superiority of a sample, the period of sample gathering (sample poised too initial or else too late during an infection), unsuitable treatment or consignment of the sample, and methodological motives.



Fig 14: COVID-19 RapidTest Kit on Trial

3.7 Covid 19 prevention :

Preventive actions to lessen the odds of contagion comprise remaining at home-based, evading packed places, observance detachment after others, wash hands with cleanser and water frequently, working good respirational cleanliness, and evading poignant the eyes, mouth, nose with dirty hands. Cover the nose and mouth by a tissue once coughing and sneezing, use elbow inside. Good hand cleanliness after cough is stimulated. The CDC has suggested the usage of fabric face covers in community locations anywhere other societal isolation actions are problematic to preserve, partly to limit communication through asymptomatic persons.

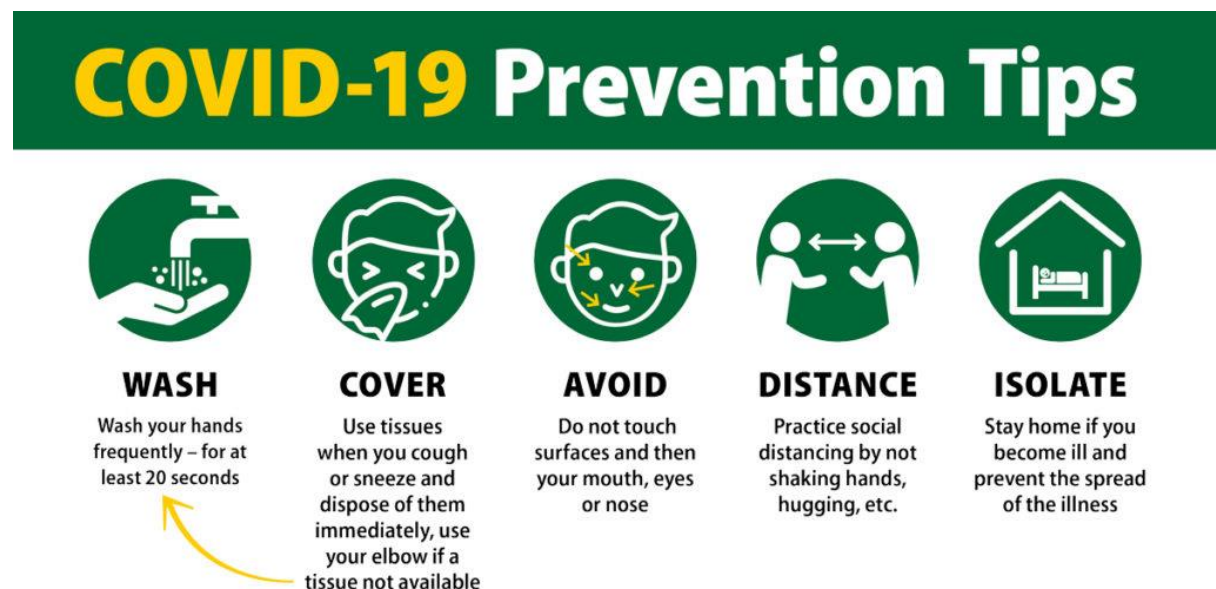


Fig 15: COVID-19 Prevention Tips Brief

Social isolation strategies goal to decrease interaction of diseased people with big collections by terminating schools, workplaces, limiting travel, stopping big community meetings, Estrangement rules also comprise that people halt 6 feet apart. Here is no medicine recognized to be active at avoiding corona. Afterward the employment of communal hostility and stay-at-home instructions, many areas have remained to tolerate an actual communication rate of fewer than 1, implication the illness is in reduction in the zones.

Those diagnosed or trust they might have ill are counselled by CDC to halt home but to acquire therapeutic care, request fast beforehand go to a healthcare worker, dress a face mask beforehand ingoing and when in a room or automobile by alternative person, shelter coughs and sneezes with soft tissue, regularly wash hands with soap and water and evade sharing individual domestic items.

For parts where profitable hand disinfectants are not available, the WHO provides 2 preparations for native production. In preparations, the antimicrobial act rises after ethanol or an isopropanol. Hydrogen peroxide used for assistance eradicates bacterial in alcohol; it is "not an lively material for hand antisepsis". Glycerol is additional as a humectant¹⁰.

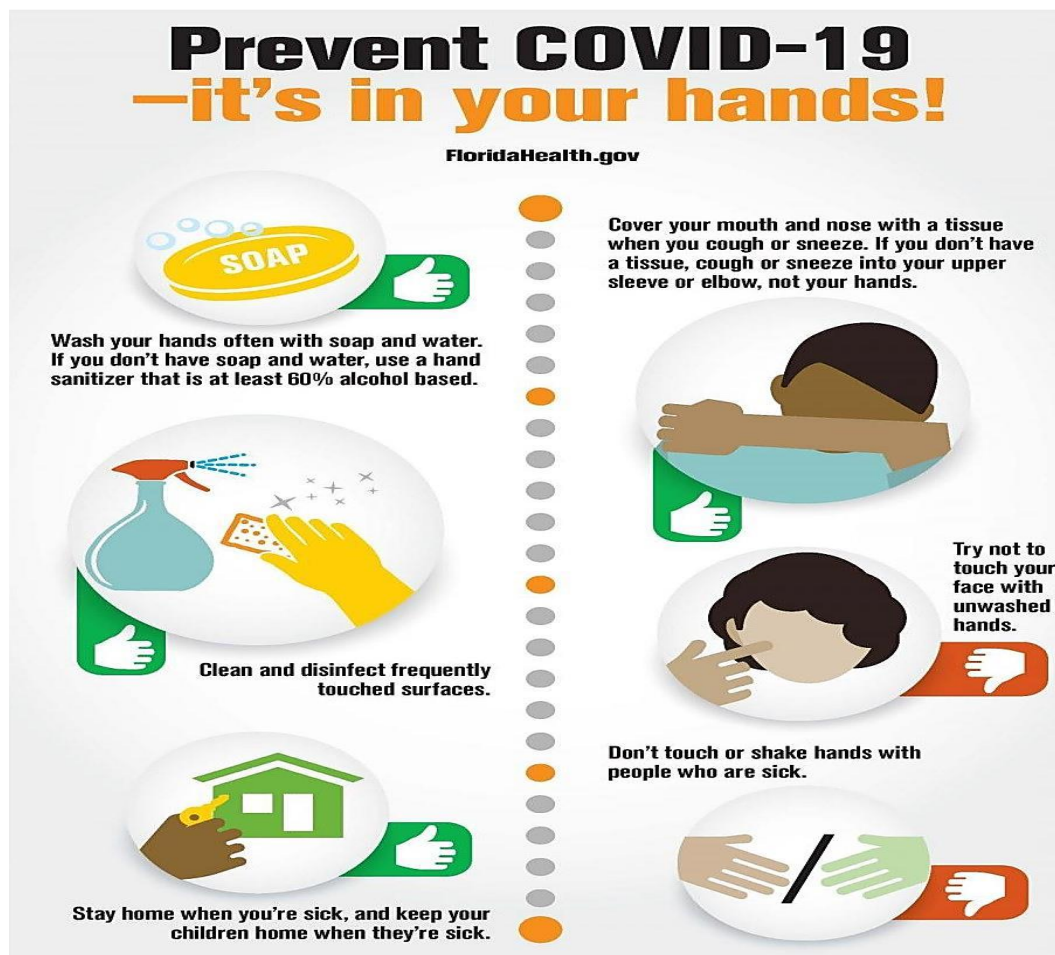


Fig 16: COVID-19 Prevention Tips

3.8 Covid 19 Management :

a) Antiviral treatment:

At present, the management of patients with corona is for the most part suggestive. Remdesivir is been accounted for as a hopeful an-inconsequential medication in contradiction of a wide exhibit of RNA infections.

Clinical organized preliminaries have demonstrated that chloroquine remained successful in the dealing of patients with corona. Remdesivir under-going countless clinical preliminaries in a few medical clinics; the adequacy of the medication is unsure at present. Arbidol, a little in give subordinate atom, was found to square popular combination of flu A and B contagions besides hepatitis C infections, and to antivirally affect SARS-CoV in cell tests; it might be an opportunities for dealing of patients with corona.

A randomized controlled investigation on the handling of corona with Arbidol and Kaletra demonstrated that Arbidol took a superior restorative impact than Kaletra and might altogether decrease the rate of extreme cases. Furthermore, lopinavir/ritonavir, nucleoside analogs, neuraminidase inhibitors, remdesivir and peptide EK1 could likewise be opportunities for the dealing of corona.

b) Chinese Medical Treatment:

Chinese medication has additionally assumed a significant job in the handling of corona. Nearby administrations and clinical organizations ensure distributed various conventional Chinese medication remedies, The New Corona infection Pneumonia Analysis and Dealing Plan (sixth preliminary rendition) proposed the utilization of a lung clearance and detoxification decoction.

A combined report by the Chinese Academy of Sciences, Wuhan Institute of Virology and Shanghai Institute of MateriaMedica found Shuanghuanglian oral fluid could repress corona. Past examinations have demonstrated that baicalin, chlorogenic corrosive and forsythin in Shuanghuanglian oral fluid have definite inhibitory consequences for different infections and microorganisms.

Lianhuaqingwen container appeared to ensure a wide-range impact on a progression of flu infections, including H7N9, and might control the invulnerable reaction

of the infection, lessening the degree of provocative elements in the beginning phase of contamination.

c) Immunoenhancement Therapy:

One opathogenesis of corona is brought about by a lopsided invulnerable reaction. Increasing the body's insusceptibility is a possible up-and-comer convention for rewarding SARS patients.

Manufactured recombinant interferon α has been demonstrated to be compelling for dealing of patients with SARS in medical preliminaries, the interferon alfacon-1 or more corticosteroids management made some tinier memories to half goal of lung radiographic variations from the norm contrasted and corticosteroids treatment alone and was related with diminished sickness related hindered oxygen immersion. Interferon was likewise seen as a successful inhibitor of MERS-CoV duplication. These discoveries recommend that interferon might be utilized in the dealing of corona.

d) Convalescent Plasma Therapy:

When no adequate antibodies or explicit medications, recuperating plasma treatment could be a viable method to ease the sequence of sickness for serious patients, in a review examination, recuperating plasma treatment is extra compelling than serious dosages of hormonal stun in patients through extreme SARS, diminishing death and restriction emergency clinic remains.

Simultaneously, antibodies can confine viral propagation in the intense period of contamination and help clear the infection, which is helpful for fast recuperation from the sickness. Hypothetically, viraemia tops during the primary seven day stretch of most popular contaminations, and it ought to be increasingly viable to give recuperating plasma from the get-go in the malady course. In this way, the plasma of patients who have recouped from corona could be gathered to plan plasma globulin explicit to corona. Be that as it may, the security of plasma globulin items explicit to corona merits further thought.

e) Auxiliary Blood Purification Treatment:

At current, extracorporeal blood cleaning innovation is utilized in the management of patients with serious NCP. As per the most recent investigation, ACE2, the important receptor of corona virus, is exceptionally ex-squeezed in human kidney (almost multiple times advanced than in lung). Kidney may be the primary objective of assault for corona.

Early ceaseless blood filtration dealing could lessen renal outstanding task at hand and help to advance the recuperation of renal capacity. The most serious instances of COVID-19 may experience the ill effects of a cytokine storm. The unevenness of genius provocative elements and mitigating components may cause invulnerable harm.¹¹⁻¹²

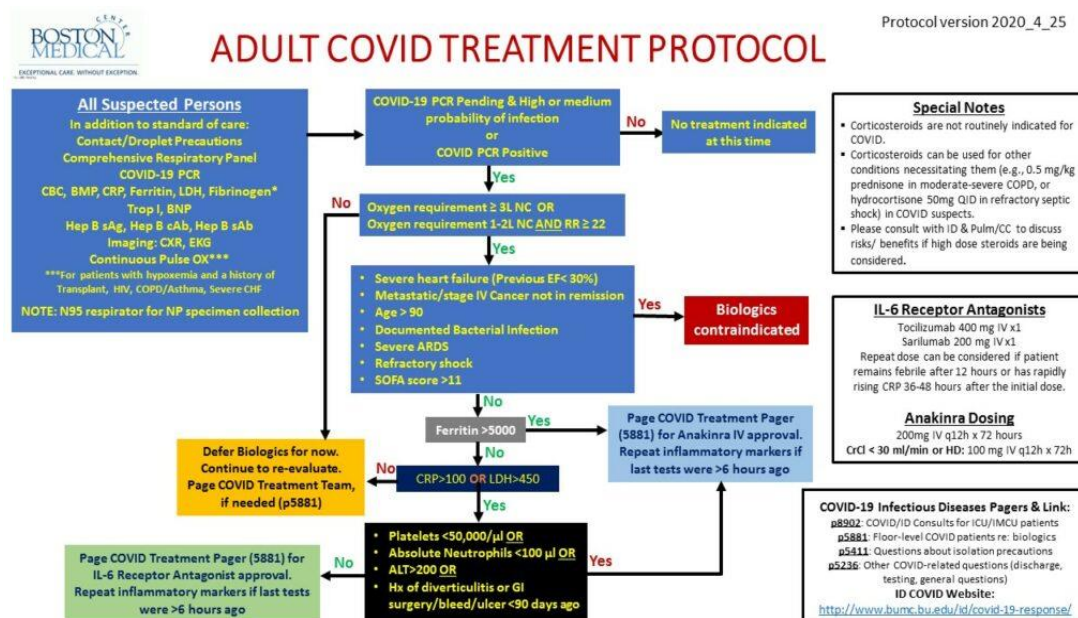


Fig 17: COVID-19 Adult Treatment Protocol

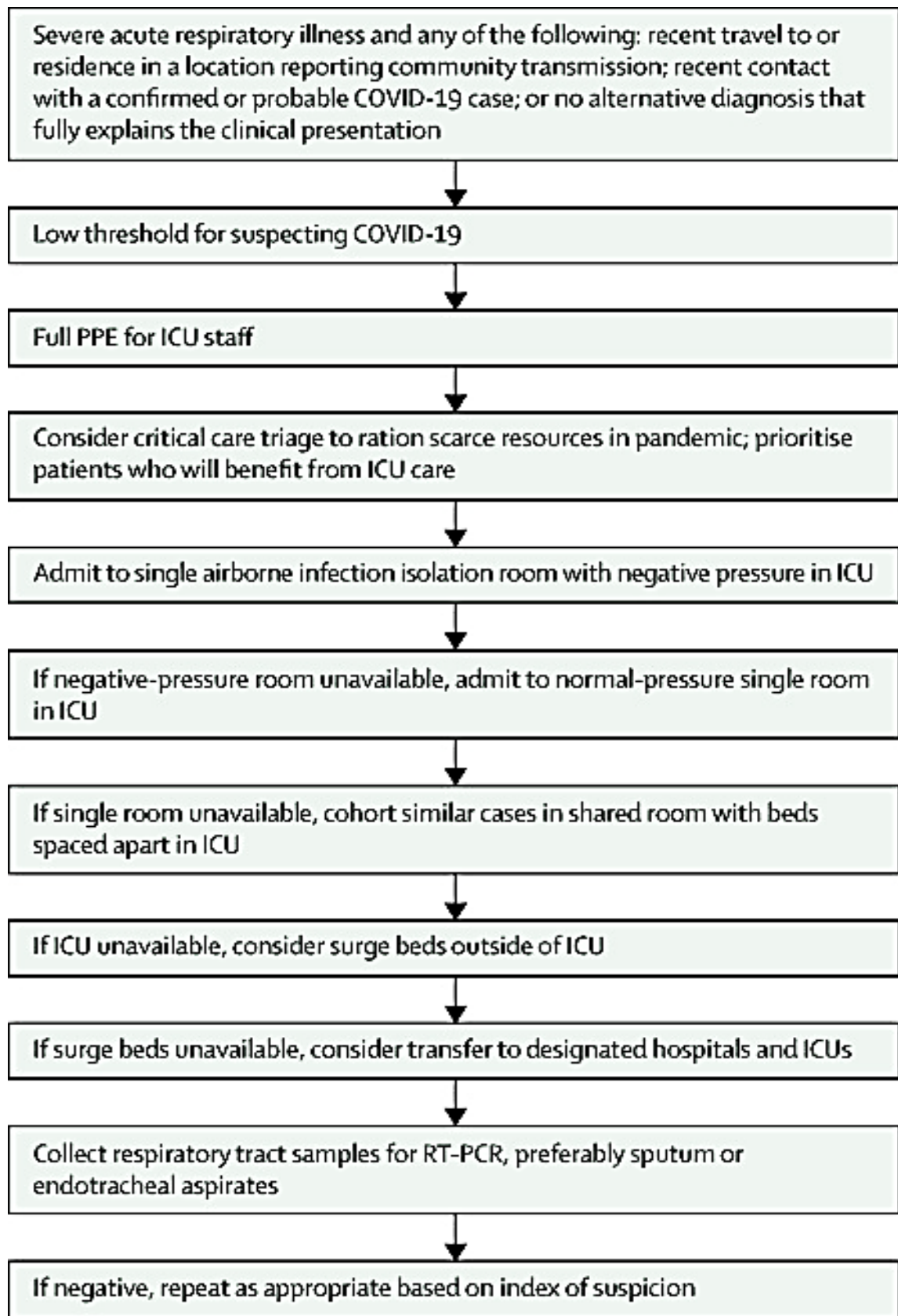


Fig 18: COVID-19 Treatment Protocol; Intensive Care Unit (ICU) Management

Chapter –4

DISCUSSION:

Out of 23 articles and reports of secondary data collected, all were methodically reviewed and compared the reports between them.

- Human transmission of the disease was initiated at the wild animal trade market in China, since then it occupied its place in the humans as a permanent host for the pandemic outbreak, this outbreak resulted with respect to the virus' vigorous community transmission, this transmission has crossed the countries and continents to result in the first global pandemics of the 21st century.
- Patients contaminated with corona revealed sophisticated leukocyte numbers, irregular breathing discoveries, and extended grades of plasma expert incendiary cytokines, fundamentally great blood points of cytokines and chemokines were prominent and the pathogenesis takes place in 3 phases such as 1) Infection of epithelial cells of the lungs 2) Acute Inflammation 3) Severe Disease.
- The hatching time of the malady is 1 to 14 days, normally 3 to 7 days, and can even arrive at twenty four days, building it hard to monitor for contaminations. Also, the malady is for the most part blow-out by respirational beads and interaction. Contaminations amongst fourteen wellbeing labourers affirmed the ailment's high contagion and elevated worries that a few people might be "super spreaders" of the infection. In a generally shut condition, vaporized transmissions can likewise happen.
- As of 2 April, 2020 most affected countries were USA, Italy, Spain, France, and Germany (Fig 5), the total confirmed deaths reached to 250,000 globally (Fig 7) and total confirmed positive cases globally were at 3.5 million by 6 May, 2020 (Fig 8). In the March 2020, Reuters and Oxford University has been predicted the outbreak of the cases in Indian subcontinent as 6 million by June 2020 as an upper limit with severe contagious level and best case scenario as 3 million (Fig 9) but the actual figure raised to above 9 million by July even under 3 months of lockdown of the whole nation.
- Confirmation/Diagnosis of the cases with suspected COVID-19 contamination is accomplished by recognition of interesting viral arrangements through nucleic corrosive intensification exams; for example, switch on-going Polymerase Chain Reaction.

- ***“Prevention is better than Cure”*** best suits the present Pandemic circumstances, as there is no available vaccine or treatment the only way to curb the community and human transmission is to take the utmost preventive measurements as effectively as possible.
- Preventative procedures to reduce the likelihoods of contamination include left over at home, upholding a tactical detachment from hovered places, keeping virtuous habits after others, washing hands by cleaning product and water regularly and for at any rate twenty seconds, practising excessive respirational cleanliness, and refraining after communicating the eyes, nose, or mouth through dirty hands, wrapping the mouth and nose with a soft tissue when wheezing and suggests employing inside the elbow if no soft tissue is nearby. Treatment options are uncertain till to date, but the proposed therapies are Antivirals, Immunoenhancement therapy, Plasma therapy and Anti-inflammatory and Analgesics. Many developed and under developed nations across the globe are in a race to discover the possible vaccine against the virus.
- First trials were started and conducted by the Oxford University in the United Kingdom, followed by the China, USA, South Korea, Australia, Cuba, India and Russia. Though Russia was the last country to express interest on vaccine preparation due to its case quantity and death rate but it's the first nation to complete all the human trials (according to the media, no evidence based articles were published).
- India is been involved actively in developing vaccines and treatment options, Indian Council of Medical Research (ICMR) and Drug Controller General of India (DCGI) are granting licenses to the pharmaceutical companies timely and effectively. Indian is in phase 1 clinical trials development stages in preparing the vaccine.

Chapter –5

CONCLUSION:

Based on the available data and my interpretations, the following conclusive points are being discussed here. All the clinical staff, human services suppliers, and, general wellbeing people and scientists are to be complied with the guidelines framed by the health ministry to curb the disease spread and to provide better care to the community.

The extensive measures are obligatory to regulate the current outbreak and person-to-person transmission of COVID-19. There should be implementation of special attentions and efforts to be applied invulnerable inhabitants counting children, health care providers etc. The public facilities should deliver cleansing reagents for cleaning hands on a repetitive basis in all the market places, malls, bus stations, railway stations etc.

Most of the death rates were observed largely in aging people, probably due to a frail resistant organization which permits quicker movement of viral contamination, hence utmost care has to be taken in these age group members which is above 57 years and should be monitored closely for the symptoms and one should be aware of all the symptoms associated with this disease so that timely response can be taken to call the doctor or health care support.

One should take care while making bodily communication with drizzly and contaminated items particularly mediators like faecal and urine testers that can theoretically serve as an alternate way of communication.

Epidemiological changes across the globe about infection must be monitored and should considered potential routes of transmission in beings and promising transitional animals and reservoirs, preventive measures have to be prepared accordingly.

There is also an uncertainty in epidemiological data available with respect to proportion of the tests conducted versus and confirmed cases, hence the present data is not efficient to be relied upon calibrating the disease potential. This can be observed related with the very few paediatric cases probably because of absence of testing or a factual absence of contagion/susceptibility.

To curb the Indian outbreak, local governments have to be effectively take the measures to control the people outspread in the community, to maintain and follow the

guidelines prescribed to prevent the disease spread. Controlled and vigilant quarantine can also be implemented in the areas of high viral spread.

Bibliography:

1. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al.; China Novel Corona virus Investigating and Research Team. A Novel Corona virus from Patients with Pneumonia in China, 2019. *N Engl J Med*. 2020 Feb; 382(8): 727–33.
2. WHOWebsite: [www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-\(covid-2019\)-and-the-virus-that-causes-it](http://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it)
3. Burrell C, Howard C, Murphy F. Fenner and White's medical virology. 5th ed. United States: Academic Press; 2016.
4. Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *Lancet* 2020.
5. J. Lei, J. Li, X. Li, X. Qi, CT imaging of the 2019 novel coronavirus (2019-nCoV) pneumonia, *Radiology* (2020) 200236.
6. Medicine, G.O.o.N.H.C.O.o.S.A.o.T.C., The diagnosis and treatment of novel coronavirus (2019-nCoV) infected pneumonia (Trial Version 6). 2020: p. 1-5.
7. Rasmussen, S.A., et al., Coronavirus Disease 2019 (COVID-19) and Pregnancy: What obstetricians need to know. *American journal of obstetrics and gynecology*, 2020: p. S0002-9378(20)30197-6.
8. Hussin A. Rothana, Siddappa N. Byrareddy, The epidemiology and pathogenesis of corona virus disease (COVID-19) outbreak. *Journal of Autoimmunity* 109 (2020) 102433.
9. Chan JF, Lau SK, To KK, Cheng VC, Woo PC, Yuen KY. Middle East respiratory syndrome coronavirus: another zoonotic betacoronavirus causing SARS-like disease. *Clin Microbiol Rev*. 2015 Apr; 28(2): 465–522.
10. Holshue ML, DeBolt C, Lindquist S, Lofy KH, Wiesman J, Bruce H, et al. First case of 2019 novel coronavirus in the United States. *N Engl J Med* 2020; 382(10): 929–36.
11. Hung IF, To KK, Lee CK, Lee KL, Chan K, Yan WW, et al. Convalescent plasma treatment reduced mortality in patients with severe pandemic influenza A (H1N1) 2009 virus infection. *Clin Infect Dis* 2011; 52: 447–56.
12. Zarbock A, Kellum JA, Schmidt C, Van Aken H, Wempe C, Pavenstadt H, et al. Effect of primary vs deferred beginning of renal replacement treatment on mortality in

critically ill patients with acute kidney injury: the ELAIN randomized clinical trial. JAMA 2016; 315:2190–9.

Annexure

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PART 2
TITLE OF ONLINE COURSE -
IMPROVING GLOBAL HEALTH:
FOCUSING ON QUALITY AND SAFETY

Course: Improving Global Health: Focusing on Quality and Safety

This course is offered by Harvard University on edX (MOOC) platform. The duration of course is 8 week i.e. 32 hours.

This course is a prologue to the rising field of worldwide human services quality. In the course of recent decades there has been an expanding acknowledgment that with the goal for medicinal services to improve populace wellbeing, it must be protected, viable, and dependably conveyed. Regardless of this acknowledgment, the nature of care that the world's residents get isn't as acceptable as possible and ought to be. The human cost of low quality social insurance is significant. The latest information proposes that low quality human services are possible one of the top reasons for dismalness and death on the planet. While there are various activities to improve medicinal services excellence in the United States, wide proof after other high-pay nations and rising proof after stumpy and center pay nations recommend that a worldwide center is required.

Cultivating access to human services is just as helpful as the nature of care gave. Many concur that excellence is significant – yet what's going on here? How would we characterize it? How would we measure it? Furthermore, above all, in what capacity may we improve it?

The course centers who care about wellbeing and human services and wish to get familiar with how to quantify and improve that care – for themselves, for their organizations, or for their nations. Every meeting was intelligent and give solid instruments that understudies can utilize. We will engage you to bring up issues, propose solid arrangements, and advance change.

They have collected driving masterminds from around the world – individuals who are specialists – as well as individuals with genuine, hands-on experience running associations, clinics, and services of wellbeing. Regardless of whether you are a doctor, nurture, or other human services supplier, on the off chance that you are an understudy of medication, general wellbeing, or wellbeing strategy, or a patient who essentially thinks about getting great consideration

Course Objectives

- The association between quality and population health.
- An outline for understanding and rational about healthcare quality.
- Methods to quality measurement.
- The part of information and communication technology in evaluating and improving quality.
- Tools and circumstantial knowledge to improve the quality conveyed in health systems.
- The prominence of concentrating on quality for enlightening population health.
- A structure for understanding healthcare quality.
- The role of information and communication technology in quality improvement.

Course Contents

Introduction

Lesson 1:Burden.....1st week (27th April to 03rd May)

Lesson2:Measurement.....2nd week (04th May to 10th May)

Lesson3:Standards.....3rd week (11th May to 17th May)

Lesson4: Improvement.....4th week (18th May to 24th May)

Lesson5:IT and Data.....5th week (25th May to 31st May)

Lesson6:Management.....6th week (01st June to 07th June)

Lesson7:Patients.....7th week (8th June to 14th June)

Lesson8:Public Systems.....8th week (15th June to 21st June)

Learning Methodology

Week-1 Learnings

1st week leanings was all about TB and Hospital Settings

Hospital Settings

In hospital settings it was mainly discussed about - Patient safety

- Outpatient settings and
- Delivery of patient care

The starting survey was done in high income counties those surveys were very convincing type. But when it reached to low or middle class counties there were notable issues found.

Tuberculosis (TB)

This session was dealt all about

- Equality
- Treatment of TB
- Diagnosis of TB
- Unusual cases and usual cases
- Drug resistant cases

These were very well explained with good set of examples which were very specific

The understandings were very crucial like, understanding the equality and applying them on the specific and suitable situations

Week -2 Learnings

2nd week learnings were all about quality measurements and different ways of measuring qualities

Quality

- Safety
- Efficiency
- Effectiveness
- Equity
- Timelines

Measurements of the Quality

The key points include

- Did the physician go to medical school
- Are they licensed people
- Do they have adequate training
- Does the hospital have adequate facility Number of beds
- Do they have adequate no of facilities
- Do they provide proper medication to patients
- Do they use proper preventive measurements for infection

Week -3 Learnings

3rd week learning's was all about mainly the role of govt. and public entities in driving quality.

The survey was done mainly on the basis of high income countries and low or middle class countries and then the malpractice done by them here we can find that in nay countries if a hospital fails to provide proper care and facility the government take appreciate action against then.

From this we can clearly understand that the government has a major role in the health care system.

This is the point of time when we need to approach these problems from the bottom line and think about the license and the accreditation provided for these health care and resolve them

Week - 4 Learnings

4th week learnings were all about knowing about an organization IHI (Institution for Healthcare Improvement) and its activities by improving people globally based on their day to day life fundamentally.

And the 2nd learning was that of improving Rwandan Health care system and issues faced by them on this approach mainly quality of work.

Understanding of this week was that mainly the quality and the improvising them on the basis of daily activities

Week -5 Learnings

5th week was all about mainly health information technology

It has improved our health care system in a very good way.

The use of health information technology is used in different countries in different ways and various aspects. In some countries it's through phones and some countries it's through box service.

All that we need to see the defects and the lagging side of this concept in various countries and help them to advance them to future. We shall also keep in mind that this Health Information Technology has made a very good impact on this new era of medical field

Week -6 Learnings

6th week was all about The Importance of Management and The Quality of Service or Work

Management

- *Measuring of management like its good or bad and how it effects the organization

- *Improving the management

- *Role of management in an organization

- *Comparison of management of organization with a hospital

Quality

If the management is very good still the settings are very low means there is a big impact on that, and there need to have a big change in there

The main learnings were management really effect the services we provide and the quality of work and how to improve them

Week -7 Learnings

7th week learnings was all about health care and patient centered care and its measurements and its improvement n

In low income countries the resources will be very less so the main idea is to overcome this problematic situation and how to give them the best out put.

Whereas in the high income countries the resources are high and they implement the best service for the health care system and for patients care.

This can be only done by taking a survey of patients from different category and taking their opinion, and suggestions to improvise them

Week -8 Learnings

8th week was all about getting some specifics, giving a big picture of overview, arming with some of the basic tools, so when we think about health care delivery, we can think about how to make that care better.

So as the course finishes, remember something Maureen Bisognano said early on in the course which is, we all have two jobs

- The job that we do on a day-to-day basis
- The job that focuses on getting better.

Regardless of profession one of the two jobs is to get better every day. Because if we all commit to getting better, we will be safer and ultimately we will improve the health and the well-being of the people that we take care of.

Key Learnings

- Causes of Burden and Harm
- Ambulatory Care
- Medication Errors
- Public-Private Variation
- Resource Allocation
- Overuse and Underuse
- Global Metrics
- Legal System and Regulation
- Staffing Ratios
- Defensive Medicine
- Patient Compensation Globally
- Systems Issues
- Building Will
- Plan-Do-Study-Act
- Implementing Data
- Personal Health Records
- Promise of Health IT
- Health Information Exchange
- Evidence and Implementation
- HIT Costs
- Role of Management
- Components of Management
- Self-criticism and Management
- Measuring Patient Experience
- Understanding Patients' Expectations
- Mexican Health Reform
- WHO Universal Coverage Cube
- Multilateral Policy Mechanisms
- Cross-National Learning

Certificate

<https://www.edx.org/course/improving-global-health-focusing-on-quality-and-sa>

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CERTIFICATE *of* ACHIEVEMENT

HarvardX



Ashish Jha, MD, MPH

K.T. Li Professor of International Health and Director, Harvard
Global Health Institute

Harvard T.H. Chan School of Public Health

This is to certify that

Dr.JANGA SRUJANA

successfully completed and received a passing grade in

**PH555x: Improving Global Health: Focusing on
Quality and Safety**

a course of study offered by HarvardX, an online learning initiative of Harvard University.



VERIFIED CERTIFICATE
Issued May 27, 2020

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Bibliography

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