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EPIDEMIOLOGY, CLINICAL CHARACTERISTICS, PREVENTION AND CONTROL OF CORONAVIRUS - A REVIEW

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Abstract

The world is in a big lockdown due to the coronavirus. It is caused by a novel virus , a modification of SARS - CoV - 2 and is spread through human to human transmission and as the days pass by the death rate is increasing rapidly as people are not following the prevention protocol properly and some are still not aware about the serious effects and preventive measures to be taken.It appeared just one month before the spring festival of China, and the massive population flow has brought great challenges for control and prevention of the disease.No specific therapeutic drug has been found for this disease.Hence health education on knowledge for controlling the disease is important.So, this review focuses on decreasing mortality rate and thereby help people return to their normal life.The review was made by collecting information based on the keywords and important points in relation to the topic through search engines like pubmed and google scholar.The present study summarises and gives an overview of COVID -19 that provides an insight to the people on this deadly disease and hence helps the people to stay safe.

Key Words: *Awareness; COVID -19; Human transmission; Symptoms; Treatment and control*

Introduction

In December 2019, a cluster of pneumonia of unknown etiology was detected in Wuhan city of China. The first 27 cases reported were all from the Huanan Seafood market that sells live aquatic products, poultries and other wild animals.It affected people through human to human transmission and community spreading. The Chinese Control Centre for prevention of disease and control, identified this unknown virus as coronavirus and the causative agent was identified as SARS COV -2 by the International Committee Of Taxonomy Virus. At present, the cases are increasing at a high rate posing a threat to public health. According to the Diagnosis and Treatment scheme for novel coronavirus pneumonia (Trial) 6th edition, the incubation period was found to be 14 days and its clinical manifestations mainly were fever, fatigue and dry cough. The aged patients were affected more due to the disease (>50yrs) when compared to young adults and children [1][2] Large shares of public ‘s feeling concerned about the various effects of the coronavirus and people were afraid that their family might get affected and hence people started taking personal preventive actions due to outbreak like cancelling their travelling plans, wearing a protective mask etc [3],[4]

Al Mohrej and Agha(2017) found that the causative agent was a positive, single stranded RNA with 120- 160nm in diameter. Seto et al (2013) said that the disease spread through large respiratory droplets (>10 micrometre) in diameter through fomites and hand contamination .Elbur et al (2016) found that close contact with bats, camels

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and infected people can lead to the transmission of disease. Due to the occurrence of recent deaths, it has become one of the most crucial viruses. But unfortunately, there is no drug treatment or vaccines separately for prevention and spread in Healthcare facilities as it is difficult to determine cause-effect relationship [5][6]. Hence, the world is at devastating epidemics leading to loss of life, economic loss, and social unrest. On 29th Jan WHO declared 2019 nCOV to be a public health emergency of International concern and the disease caused by this has been named as COVID -19 by WHO on Feb 11 2020 [7, 8].In present, real time reverse transcription-polymerase chain reaction (RT-PCR) assay for COVID-19 has been in clinics for diagnosing but due to high false negative rate and unavailability in the early stage of outbreak , it lead to the restriction of diagnosis in patients [9][10]

This study was made as people were not aware about the serious effects of the outbreak and hence an awareness is needed to be created on the symptoms and prevention of coronavirus to save the people and keep the country safe.

METHODOLOGY

The study setting is a review. The information is obtained by searching the keywords and the data is collected through search engines like Pubmed and google scholar.They were collected with a restriction in time basis from 2005 - 2020. The Inclusion criteria considered review and original research articles based on COVID-19, Causes, symptoms, prevention and treatment. Exclusion criteria included retracted articles and articles related to other categories. The article is reviewed from 38 articles collected.

The data was collected and quality analysis of the collected data was done manually and graded as strong, moderate and weak as shown in table 1.The knowledge at current point of time was analysed and thus the consensus was established.

Table - 1: Shows the Grading of review articles on Coronavirus COVID-19

Author	Year	Source	Quality
Sheng - Qun Deng et al	2020	Pubmed	Strong
Cailey Munana et al	2020	Google scholar	Weak
Hanna zakaria	2020	Pubmed	Moderate
Susan R. Weiss et al	2005	Pubmed	Strong
Jasper Fuk-Woo Chan	2020	Pubmed	Moderate
Khot WY et al	2020	Pubmed	Moderate

Zu Zy, Jiang MD et al	2020	Pubmed	Weak
Lipstich M. Swerdlow et al	2020	Pubmed	Weak
Ge H, Wang X et al	2020	Pubmed	Strong
Siordia JA et al	2020	Pubmed	Moderate
Zhu N, Zhang D et al	2019	Pubmed	Moderate
Li W, Sui J et al	2007	Google scholar	Weak
Ruben J. G. Hulswit	2019	Google scholar	Weak
Xintian Xu et al	2020	Google Scholar	Moderate
National Health Commission of the People's Republic of China and National Administration of Traditional Chinese Medicine. Diagnosis & Treatment Scheme for Novel Coronavirus Pneumonia (Trial) 6th Edition	2020	Google scholar	strong
Kenneth McIntosh Et al	2020	Google scholar	Moderate
Jaime G Deville	2020	Google scholar	weak
Chaolin Hung et al	2020	Pubmed	strong

Abdul Hafeez et al	2020	Google scholar	Moderate
Marco Cascella et al	2020		
National Health Commission of the People's Republic of China. Technical Guide for Prevention and Control of New Coronavirus Infection in Medical Institutions (Second Edition)	2020	Google scholar	strong
AdhikariS , Meng S et al	2020	pubmed	moderate
Wei-jie Guan et al	2020	pubmed	moderate

EPIDEMIOLOGY OF THE VIRUS

With the occurrence of SARS, the epidemic coronavirus is considered as one of the emerging pathogens having its origin from SARS COV posing interesting questions on evolution of the coronavirus. It is species specific causing acute and chronic respiratory syndrome and enteric central nervous system diseases.The biological vectors of coronavirus include both humans and animals. However, the original vector is not yet confirmed. But serological and genetic evidence done by various studies supposed that it had a zoonotic origin.This hypothesis was first based onReports demonstrated on patients containing SARS in Guangdong province, Where the infected people were once exposed to wild games animals in market and conserving the restaurant trade [11][12]. The fatality rate cumulatively increased due to the improvement of diagnosis and transmission through respiratory droplets [13][14]. Experience with the Middle East respiratory syndrome(MERS), pandemic influenza and other outbreaks has shown that as an epidemic evolve, urgent need is done to expand the public health activities so as to characterize its potential impact.The number of cases from mild to severe, is necessary to calibrate and epidemic response [15, 16]

Currently covid-19 has spread widely Around The World affecting more than 70 countries and China which has suffered a huge burden due to this disease has taken strong measures to control spread and improve the curative rate of covid-19.This is the third coronavirus pneumonia in the past 20 years around the world with bats being the most probable original reservoirs based on the current evidence but specific animals associated with the virus have not identified [17] [18]Close contact with someone during infectious period puts one at risk of acquiring the infection. But the certainty of becoming infected is unpredictable.Burke et al tested 445 people who were in close contact with 10 covid-19 confirmed patients (at least 6 feet from the source for minimum 10 minutes) and after 2 weeks, when tested found that only two became positive [19, 20]

PATHOGENIC CHARACTERISTICS

The coronavirus are single stranded Enveloped RNA positive viruses. They belong to genus beta.There are 6 kinds of species.This species is 7th kind different from MERSr- COV and SARS - COV. It is sensitive to heat

and kill at 56 degree Celsius for 30 minutes. 4 viruses 229E OC 43, NL 63 and HKU 1 are prevalent and typically cause common cold symptoms in immunocompetent individuals. The 2 other strains MERSr- COV and SARS - COV Zoonotic in origin and are linked to cause fatal illness [21][22]Human coronavirus HCOV - 229E (group1), HCoV - OC43 and COV - HKU 1(both group 2), cause mild disease and is responsible for common cold and more serious lower respiratory tract infections (15% - 30%) given by (Woo et al, 2015).SARS COV was fatal to 10% of infection (Bastien et al,2005; Leet et a, 2003; Piris et al,2003; Zhong et al; 2003) [23, 24]

The receptor binding is mediated by the spike protein (s) which is the main determinant of coronavirus Host specificity. However, the location of the receptor binding site is not known.In rare instances, OC43 virus can cause lethal encephalitis. The receptor binding protein (RBS) is not exclusive to OC43 and related animal viruses but conserved and functional even in HKU1 S1 but the binding is significantly lower than OC43[25][26]One genome sequence (WH - Human - 1) of Wuhan CoV was first released on Jan 10, 2020 which was then followed by the release of subsequently 5 additional genome sequences of Wuhan CoV. The Wuhan CoV cluster was situated with groups of SARS or SARS like coronavirus but Bat coronavirus HKU9 -1 was considered as an immediate group [27][28]

CLINICAL CHARACTERISTICS

Fever, fatigue, dry cough are considered to be the main manifestations whereas nasal obstruction, running nose and upper respiratory problems are rare. About half the patients developed dyspnea one week later and severe cases developed rapidly like acute respiratory distress syndrome , septic shock, coagulation dysfunction and hard to correct metabolic acidosis [29]. Among hospitalised patients, the proportion of critical or fatal disease is higher. The proportion of severe and fatal infections also vary location by location. It predominantly occurs in adults of advanced age or people having underlying medical comorbidities like CVD disease, diabetes mellitus, hypertension, chronic lung disease. Patients with severe disease reported higher viral RNA levels than present in milder disease and pneumonia is considered as the most frequent, serious manifestation of the injection characterized [30] [31]

In young infants, SARS COV -2 causes fever without an obvious source and minimal respiratory symptoms and difficulty in feeding them. Lymphopenia and thrombocytosis were found to be common laboratory findings. The symptoms varied from mild to severe [32].Patients with severe illness develop ARDS and require ICU admission and oxygen therapy. similarities of clinical features between 2019nCoV and previous beta coronavirus have been noted. These people rarely developed intestinal symptoms. autopsy for biopsy study would be the key to understand this disease. In view of the high amount of cytokines induced by SARS-COV, corticosteroids were frequently used for the treatment of patients suffering from severe illness as it helps in separating the inflammation by activating t helper cells. abnormality in CT chest images were detected in the infected people [33]

TREATMENT

People who are affected with the virus are kept in isolation in hospitals, providing them with complete bed rest and paying attention to their water - electrolyte balance. An effective oxygen therapy, antiviral treatment and antibacterial treatment based on the symptoms to be given to prevent the secondary infection. Respiratory and circulation support to be given to severe cases [33].Tracking and diagnostic testing are critical to understand the epidemiology and thereby suppressing the transmission for testing COVID - 19 presence, the doctor may collect samples of saliva (septum), a nasal swab and sent to lab for testing optimised supportive care remains to be the backbone of clinical efficacy. Antiviral therapy taken from other viruses like SARS - COV - 1, MERs - COV and even non coronaviruses like Ebola. The respiratory tract should be kept unobstructed in more severe cases; measuring the blood count and C - reactive protein,chest imaging and blood gas analysis should be re-examined and performed when required [34].

There is no specific antiviral treatment recommended for COVID - 2019 as the vaccine is not available currently. Treatment is symptomatic and the major treatment for severe illness is oxygen therapy. Mechanical ventilation is provided incase of respiratory failure refractory to oxygen therapy and hemodynamic support to be

given to manage the septic shock. On Jan 28, 2020 the WHO released a summary of guidelines and scientific evidence from treatment of various previous epidemics for infection prevention and control. Hydroxychloroquine is also used as an effective drug against the virus. If possible special precautions like rapid sequence intubation (RSI) should be performed [35]

PREVENTION AND CONTROL

As on 26th Jan 2020, thirty provinces were initiated with level 1 public health response by setting up observation rooms in stations, airports and detecting body temperature and observation of suspicious patients. Overall guidance of epidemic control is needed and strengthening of laboratory tests is essential [36]Prevention and control strategies and methods are reported at three levels: National level, Case related population level and general population level. At the National level, the National Health Commission of people's Republic of China Issue No:1 announcement on 20, Jan 2020, included the COVID - 19 management of class B legal infectious diseases, adaptation of isolation treatment by medical Institutions and observation protocols to prevent and control the spread of COVID- 19. The China CDC published a guideline that included causes and how to choose and wear proper masks, proper steps of washing hands and preventive measures that need tobe taken in different locations (Eg. at home, public transport, public space), disinfection method and other medical observations that need to be done in the house. Quarantines have discussed the way to reduce the chances of transmission in large numbers. Hence, the best prevention is to avoid being exposed to the virus.[37]

Early protection, identification, diagnosis and early isolation are crucial to combat the COVID- 19 outbreaks. The therapies target the airway humidification and suppression of the mucin secretion might help improve the clinical outcomes. Not all hospitals are provided with sufficient resources hence, those must be taken to identify the asymptomatic Viral Carriers. Improved personal protection and hygiene management at community levels where officially enclosed to protect the population from Infections[38]

LIMITATIONS

It prevented the Researchers from assessing the relationship between Corona disease and other risk factors to determine a case - effect relationship.

FUTURE SCOPE

The Review applied a systemic and Rigorous search strategy on relevant articles based on the objectives of the study and summarises the scientific foundations and suggests some evidence for future research directions on COVID- 19 which will help in creating awareness among the public.

CONCLUSION

More studies regarding the prevention and treatment of the virus are to be made to minimise the impact of outbreak, as the disease profile is dynamic and rapidly evolving everyday. There are still many open questions that are pending regarding COVID-19. This review might help us to provide adequate information about corona virus and its complications and treatment methods.

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CONFLICT OF INTEREST - NIL

REFERENCES

[1] Deng S-Q, Peng H-J. Characteristics of and Public Health Responses to the Coronavirus Disease 2019 Outbreak in China. *J Clin Med Res*; 9. Epub ahead of print 20 February 2020. DOI: 10.3390/jcm9020575.

[2] Samuel AR, Devi MG. Geographical distribution and occurrence of Endemic Goitre. *Research Journal of Pharmacy and Technology* 2015; 8: 973.

[3] The Public's Awareness Of and Concerns About Coronavirus. *KFF*, https://www.kff.org/coronavirus-covid-19/issue-brief/the-publics-awareness-of-and-concerns-about-coronavirus/ (2020, accessed 3 June 2020).

[4] Baheerati MM, Gayatri Devi R. Obesity in relation to Infertility. *Research Journal of Pharmacy and Technology* 2018; 11: 3183.

[5] Nooh HZ, Alshammary RH, Alenezy JM, et al. Public awareness of coronavirus in Al-Jouf region, Saudi Arabia. *Z Gesundh Wiss* 2020; 1–8.

[6] Fathima F, Preetha P. EVALUATION OF THYROID FUNCTION TEST IN OBESE PATIENTS. *Asian Journal of Pharmaceutical and Clinical Research* 2016; 9: 353.

[7] Khot WY, Nadkar MY. The 2019 Novel Coronavirus Outbreak - A Global Threat. *J Assoc Physicians India* 2020; 68: 67–71.

[8] Rj I, R GD. Role of environmental factors on sleep patterns of different age groups. *Asian Journal of Pharmaceutical and Clinical Research* 2016; 9: 124.

[9] Zu ZY, Jiang MD, Xu PP, et al. Coronavirus Disease 2019 (COVID-19): A Perspective from China. *Radiology* 2020; 200490.

[10] Harsha L, Priya J, Shah KK, et al. Systemic Approach to Management of Neonatal Jaundice and Prevention of Kernicterus. *Research Journal of Pharmacy and Technology* 2015; 8: 1087.

[11] Weiss SR, Navas-Martin S. Coronavirus pathogenesis and the emerging pathogen severe acute respiratory syndrome coronavirus. *Microbiol Mol Biol Rev* 2005; 69: 635–664.

[12] Dave PH, Preetha. Pathogenesis and Novel Drug for Treatment of Asthma-A Review. *Research Journal of Pharmacy and Technology* 2016; 9: 1519.

[13] Chan JF-W, Yuan S, Kok K-H, 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; 395: 514–523.

[14] Abigail, Priya J, et al. Evaluation of Muscular Endurance among Dentists. *Indian Journal of Public Health Research & Development* 2019; 10: 258.

[15] Lipsitch M, Swerdlow DL, Finelli L. Defining the Epidemiology of Covid-19 - Studies Needed. *N Engl J Med* 2020; 382: 1194–1196.

[16] Shruthi M, Preetha S. Effect of Simple Tongue Exercises in Habitual Snorers. *Research Journal of Pharmacy and Technology* 2018; 11: 3614.

[17] Ge H, Wang X, Yuan X, et al. The epidemiology and clinical information about COVID-19. *Eur J Clin Microbiol Infect Dis* 2020; 39: 1011–1019.

[18] Choudhari S, Jothipriya MA. Non-alcoholic fatty liver disease. *Research Journal of Pharmacy and Technology* 2016; 9: 1782.

[19] Siordia JA Jr. Epidemiology and clinical features of COVID-19: A review of current literature. *J Clin*

Virol 2020; 127: 104357.

[20] Iyer PK, Gayatri Devi R, Jothi Priya A. A Survey Study on Causes, Treatment and Prevention of Onychocryptosis. *Indian Journal of Public Health Research & Development* 2019; 10: 807.

[21] Zhu N, Zhang D, Wang W, et al. A Novel Coronavirus from Patients with Pneumonia in China, 2019. *N Engl J Med* 2020; 382: 727–733.

[22] R GD, Sethu G. EVALUATION OF ADENOIDS BY ORONASAL AND NASAL SPIROMETRY. *Asian Journal of Pharmaceutical and Clinical Research* 2018; 11: 272.

[23] Li W, Sui J, Huang I-C, et al. The S proteins of human coronavirus NL63 and severe acute respiratory syndrome coronavirus bind overlapping regions of ACE2. *Virology* 2007; 367: 367–374.

[24] Swathy S, Gowri Sethu V. Acupuncture and lower back pain. *Research Journal of Pharmacy and Technology* 2015; 8: 991.

[25] Hulswit RJG, Lang Y, Bakkers MJG, et al. Human coronaviruses OC43 and HKU1 bind to 9-O-acetylated sialic acids via a conserved receptor-binding site in spike protein domain A. *Proceedings of the National Academy of Sciences* 2019; 116: 2681–2690.

[26] Renuka S, Sethu G. Regeneration after Myocardial Infarction. *Research Journal of Pharmacy and Technology* 2015; 8: 738.

[27] Xu X, Chen P, Wang J, et al. Evolution of the novel coronavirus from the ongoing Wuhan outbreak and modeling of its spike protein for risk of human transmission. *Science China Life Sciences* 2020; 63: 457–460.

[28] Timothy CN, Gayatri Devi R, Jothi Priya A. Evaluation of Peak Expiratory Flow Rate (PEFR) in Pet Owners. *Indian Journal of Public Health Research & Development* 2019; 10: 803.

[29] The General Office of National Health Commission. Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia (Trial Version 6, Revised). *Chinese medical journal*, http://www.kankyokansen.org/uploads/uploads/files/jsipc/protocol_V6.pdf (2020).

[30] David, Priya AJ, Devi G. Physical Fitness among the Dental Physician, Dental Undergraduates and Postgraduates Students. *Indian Journal of Public Health Research & Development* 2019; 10: 223–226.

[31] Mclntosh K. Coronavirus disease 2019 (COVID-19): Epidemiology, virology, and prevention. *Uptodate*, https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19-epidemiology-virology-and-prevention (2020, accessed 3 June 2020).

[32] Deville JG. Coronavirus disease 2019 (COVID-19): Considerations in children. In: Edwards MS, Torchia MM (eds) *UpToDate*. Waltham, MA: UpToDate, https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19-considerations-in-children (2020).

[33] Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020; 395: 497–506.

[34] Ahmad S. A Review of COVID-19 (Coronavirus Disease-2019) Diagnosis, Treatments and Prevention. *Eurasian Journal of Medicine and Oncology*. Epub ahead of print 2020. DOI: 10.14744/ejmo.2020.90853.

[35] Cascella M, Rajnik M, Cuomo A, et al. Features, Evaluation and Treatment Coronavirus (COVID-19). In: *StatPearls*. Treasure Island (FL): StatPearls Publishing, https://www.ncbi.nlm.nih.gov/pubmed/32150360 (2020).

[36] Govt C. New Coronavirus Infection Pneumonia Prevention and Control Plan (Second Edition). *19. National Health Commission of the People's Republic of China. Technical Guide for Prevention and Control of New Coronavirus Infection in Medical Institutions (Second Edition) (2020-01-22).*,

http://www.nhc.gov.cn/jkj/s3577/202001/c67cfe29ecf1470e8c7fc47d3b751e88.shtml (accessed on 19 February 2020). (2020, accessed 3 June 2020).

[37] Adhikari SP, Meng S, Wu Y-J, et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. *Infect Dis Poverty* 2020; 9: 29.

[38] Guan W-J, Chen R-C, Zhong N-S. Strategies for the prevention and management of coronavirus disease 2019. *Eur Respir J*; 55. Epub ahead of print April 2020. DOI:10.1183/13993003.00597-2020.

[39] Farhat Yaasmeen Sadique Basha, Rajeshkumar S, Lakshmi T, Anti-inflammatory activity of Myristica fragrans extract . Int. J. Res. Pharm. Sci., 2019 ;10(4), 3118-3120 DOI: https://doi.org/10.26452/ijrps.v10i4.1607