International Journal of Scientific Research in Science and Technology
Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

A Review COVID 19 : A Zoonotic Disease and a Relentless Widespread Global Pandemic

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Article Info

Volume 7, Issue 5
Page Number: 356-367

Publication Issue :
September-October-2020

Article History
Accepted : 15 Sep 2020
Published : 30 Sep 2020

ABSTRACT

A zoonosis or zoonotic disease is an infectious disease that is transmitted between species from animals to humans (or from humans to animals). Some don't make the animal sick but will sicken a human. Zoonotic diseases range from minor short-term illness to a major life-changing illness. The zoonotic transmission may take place in any context in which there is contact of human with animals such as through consumption of animal meat or using animal products , through pets, farming, butchering, hunting , bushmeat or using animals in any kind of research context. Zoonoses can also be transmitted through the air or with contact of an infected animal through insect bites or animal bites. Many zoonotic diseases are very difficult to control and sometime uncontrollable. It is seen that the risk of becoming infected with a zoonotic disease is increased in person affected by immunosuppression from a preexisting disease or medication. In this review article the main objective is to study on the present pandemic that the world is facing Covid 19 SARS CoV 2 and which is already declared as a zoonotic disease by many researchers and scientists. It also aims that COVID -19 has zoonotic source. The focus is basically on the previous studies done related to the same (Zoonotic diseases and Covid 19 and their connection). It also aims upon the outlook of zoonotic diseases that varies on the types of diseases, pathogens, animals involved, mode of transmission and emergence. Taking the example of the highly pandemic zoonotic diseases such as Rabies, Swine influenza, West Nile fever, Zika fever, HIV, Ebola virus, SARS coronavirus, MERS coronavirus and Covid 19 SARS Cov 2 all are of great concern and need to be studied.

Keywords : Zoonosis, Zoonotic disease, Zoonoses, , Zoonotic Influenza, Spillover, Coronavirus, SARS CoV, MERS CoV, SARS-CoV-2, COVID-19 .

I. INTRODUCTION

Zoology has an illustrious history; it has triggered paradigm shifts in thinking. One of the best known was Darwin's theory of evolution, based on his observations of the natural world. It became the cornerstone of current zoological research. Very few sub-disciplines of zoology are not firmly anchored on ideas around change over time, driven by some advantage that individuals get from specific heritable characteristics. In this spirit of observation of nature, linked to robust and detailed analyses of trends, zoologists have been sounding the alarm for many years about the current mass extinction and the negative consequences of disrespecting nature. Ultimately, COVID-19 is zoological in origin. And now, in the midst of the pandemic, it is modelers, virologists, medical specialists and engineers who are driving the scientific response to the global crisis (13).

It has been observed in the past and present health status of the world that there is a great adverse impact of zoonotic diseases. Most of them resulted in the increase of morbidity rate and simultaneously the mortality rate of human population. Typically, the first infected human transmits the infectious agent to at least one other human, who, in turn, infects others. Recent researches and studies suggest that these zoonotic diseases are becoming very harmful, uncontrollable and are of great concern. Zoonoses may appear suddenly and be relatively virulent, as illustrated by HIV which ignited the AIDS (here the virus is HIV and the Disease is AIDS) epidemic and the Coronavirus responsible for the outbreak of SARS (here the virus is Corona and the Disease is SARS). Ebola virus, Salmonellosis, HIV, Bird flu, Swine flu all are Zoonotic viruses and are responsible to cause pandemic when recombine with human strains.

So far, research has targeted species known for carrying diseases that can infect other species – such as bats and primates. But this will need to be expanded to, for example, carnivores. Zoologists have known for decades that some of the most virulent viral infections are animal in origin. These viruses occur naturally and at low levels. In their natural animal hosts they are often not harmful. Viruses are not autonomous. They require the host's DNA to replicate. Many viruses are therefore species-specific and cannot replicate outside their natural host. But a random mutation in the right location in the virus's DNA can allow the virus to establish in a new host species. Perhaps the best-known example is HIV/AIDS, which is simian (chimpanzee) in origin. Here, the simian immunodeficiency virus successfully transitioned to humans – through contact with animal blood or meat – to become the human immunodeficiency virus or HIV, causing AIDS.

18 years ago, in 2002, the world was astonished by the appearance of Severe Acute Respiratory Syndrome (SARS), supported by a zoonotic coronavirus, called SARS-CoV, from the Guangdong Province of southern China. After about 10 years, in 2012, another similar coronavirus triggered the Middle East Respiratory Syndrome (MERS-CoV) in Saudi Arabia. Both caused severe pneumonia killing 774 and 858 people with 8700 cases of confirmed infection for the former, and 2494 for the latter, causing significant economic losses. 8 years later, despite the MERS outbreak remaining in certain parts of the world, at the end of 2019, a new zoonotic coronavirus (SARS-CoV-2) and responsible of coronavirus Disease (COVID-19), arose from Wuhan, Hubei Province, China. It spread rapidly and to date has killed 3,242 persons with more than 81,000 cases of infection in China and causing over 126,000 global cases and 5,414 deaths in 166 other countries around the world, especially Italy. SARS-CoV-2 would seem to have come from a bat, but the intermediate reservoir continues to be unknown. Nonetheless, as for SARS-CoV and MERS CoV, the Spillover effect linked to animal-human promiscuity, human activities including deforestation, illegal bush-trafficking and bushmeat, cannot be excluded. Recently, however, evidence of inter-human only transmission of SARS-CoV-2 has been

accumulated and thus, the outbreak seems to be spreading by human-to-human transmission throughout a large part of the world. (6) The new name of these diseases is coronavirus disease 2019, abbreviated as COVID-19. In COVID-19, "CO" stands for corona, "VI" for virus, and "D" for disease. Formerly, this disease was referred to as "2019 novel coronavirus" or "2019-nCOV". Available evidence suggests that the virus is predominantly transmitted between people through respiratory droplets and close contact, but there are also examples of transmission between human and animals. Several animals that have been in contact with infected humans, such as minks, dogs, domestic cats, lions and tigers, have tested positive for SARS-CoV-2 (14).

Zoonotic Disease or Zoonoses

A zoonosis is any disease or infection that is naturally transmissible from vertebrate animals to humans. There is over 200 known types of Zoonoses. Zoonoses comprise a large percentage of new and existing diseases in humans .Some Zoonoses, such as rabies, are 100% preventable through vaccination and other methods. Animals provide many benefits to people. Many people interact with animals in their daily lives, both at home and away from home. However, animals can sometimes carry harmful germs that can spread to people and cause illness – these are known as **zoonotic diseases** or Zoonoses. Zoonotic pathogens may be bacterial, viral or parasitic, or may involve unconventional agents and can spread to humans through direct contact or through food, water or the environment. They represent a major public health problem around the world due to our close relationship with animals in agriculture, as companions and in the natural environment. Zoonoses can also cause disruptions in the production and trade of animal products for food and other uses (4). Zoonotic diseases are caused by harmful germs like viruses, bacteria, parasites, and fungi. These germs can cause many different types of illnesses in people and animals, ranging from mild to serious illness and even death. Animals can sometimes appear healthy even when they are carrying germs that can make people sick, depending on the zoonotic disease. Zoonotic diseases are very common around the world. Scientists estimate that more than 6 out of every 10 known infectious diseases in people can be spread from animals, and 3 out of every 4 new or emerging infectious diseases in people come from animals. Because of this, CDC (Centers for Disease Control and Prevention) works 24/7 to protect people from zoonotic diseases in the United States and around the world (3).Zoonoses comprise a large percentage of all newly identified infectious diseases as well as many existing ones. Some diseases, such as HIV, begin as a zoonosis but later mutate into human-only strains. Other Zoonoses can cause recurring disease outbreaks, such as Ebola virus disease and Salmonellosis. Still others, such as the novel coronavirus that causes COVID-19, have the potential to cause global pandemics (4) .Zoonotic influenza is a flu caused by viruses that originate in animals, or type A influenza viruses. Out of the four types of influenza viruses, type A viruses cause the most severe disease, and are found in ducks, chickens, pigs, whales, horses, seals and cats, according to the CDC. Only type A flu viruses are known to cause flu pandemics, or global epidemics of the flu. Both type A and type B influenza viruses can cause seasonal flu epidemics but type B viruses circulate only in humans. Type C flu viruses rarely cause severe illness, while type D mainly infects cattle and isn't known to infect humans (1).

The Centers for Disease Control and Prevention (CDC) and its U.S. government partners have released the first federal collaborative report listing the top zoonotic diseases of national concern for the United States. To prevent and respond to these diseases scientists emphasized on a One Health approach. One Health is an approach that recognizes the connection between people, animals, plants, and their shared environment and calls for experts in human, animal, and environmental health to work together to achieve the best health outcomes for all .Six out of every 10 infectious diseases in people are zoonotic, which makes it crucial that the nation strengthen its capabilities to prevent and respond to these diseases using a One Health approach. One Health is an approach that recognizes the connection between people, animals, plants, and their shared

environment and calls for experts in human, animal, and environmental health to work together to achieve the best health outcomes for all(2).

The novel coronavirus is one such germ, and the disease it causes, COVID-19, is a zoonotic disease. We already know that the large-scale destruction of natural animal habitats increases human society's exposure to diseases like COVID-19. Corporatised meat production systems as well as the trade in wildlife, and wildlife products, also heighten our contact with these pathogens. Studies have already raised concerns on tuberculosis spreading from humans to elephants. Captive elephants in India have displayed asymptomatic infections of Mybobacterium tuberculosis, the disease's causative bacteria. Similarly, studies have illustrated the risks of disease transmission from elephants to humans. This means tourism models using animals as performers can be potential drivers of zoonotic diseases, with implications for public health and elephant populations at large(8).

Recent studies suggest that these diseases can produce large societal impacts in endemic areas. Estimates of monetary impact and disease burden provide essential, evidence-based data for conducting cost-benefit and cost-utility analyses that can contribute to securing political will and financial and technical resources. To evaluate burden, monetary and non-monetary impacts of Zoonoses on human health, agriculture and society should be comprehensively considered. The study reviews the framework used to assess the health impact and burden of Zoonoses and the data needed to estimate the extent of the problem for societies. Case studies are presented to illustrate the use of burden of disease assessment for the zoonotic diseases cystic Echinococcosis, Taenia solium cysticercosis, brucellosis and rabies (11).

Spillover

The novel coronavirus is the latest in a long list of pathogens that have jumped from animals to human beings, triggering pandemics that have killed hundreds of millions.

COVID-19 underscores the desperate need to better understand and control the intersection of animal and human health **.The 21st century has already experienced** four major spillovers: SARS (horseshoe bats via civet cats), H1N1 flu (pig), MERS (bats via camel), and COVID-19 (bats via an intermediate)

The most widely accepted theory of the origins of COVID-19 is a textbook example of how "zoonotic spillovers" occur.

- From a bat — which often feature as the reservoir species for zoonoses, in part because there are simply so many of them — the novel coronavirus probably jumped to an intermediate species more likely to come in contact with humans.
- One candidate is the pangolin, a scaly anteater sometimes eaten or used for medicine in China, and one of countless wild species sold live in the country's wet markets. Such wet markets have emerged as what Chris Walzer of the Wildlife Conservation Society calls "the biggest risk factor" for spillovers, as highly stressed wild animals come into close contact with human beings through handling, butchering, and consumption.
- Based on genetic analyses of the novel coronavirus, it likely took only a single spillover event from an infected animal to a human being to kick off a pandemic that has already killed more than 250,000 people around the world (21).

Zoonotic diseases have shaped the life of human beings during centuries. Particularly the dynamics and changes over time make the difference in the occurrence, emergence and re-emergence of such conditions.

Zoonotic spillover requires a blend of several factors to ignite, including the ecological, epidemiological and behavioral determinants of pathogen exposure, and the within-human intrinsic factors that affect susceptibility to infection, as well as nutritional and cultural factors, associated with foodborne zoonotic diseases (18).

Zoonoses, or zoonotic diseases, are infectious diseases caused by bacteria, viruses, and parasites that are able to spread or "spill" between animals and humans. Phytoviruses are those viruses highly prevalent in plants worldwide, including vegetables and fruits. Spillover events are defined as pathogen transmission from a reservoir host population to a novel host population (17).Spillover infection, also known as pathogen spillover and spillover event, occurs when a reservoir population with a high pathogen prevalence comes into contact with a novel host population. The pathogen is transmitted from the reservoir population and may or may not be transmitted within the host population (15). Zoonotic spillover, which is the transmission of a pathogen from a vertebrate animal to a human, presents a global public health burden but is a poorly understood phenomenon. Zoonotic spillover requires several factors to align, including the ecological, epidemiological and behavioral determinants of pathogen exposure, and the within-human factors that affect susceptibility to infection. Spillover transmission is promoted by successive processes that enable an animal pathogen to establish infection in a human. The probability of zoonotic spillover is determined by interactions among several factors, including disease dynamics in the reservoir host, pathogen exposure and the within-human factors that affect susceptibility to infections. These factors can be partitioned into three functional phases that describe all major routes of transmission. In the first phase, the amount of pathogen available to the human host at a given point in space and time, known as the pathogen pressure, is determined by interactions among reservoir host distribution, pathogen prevalence and pathogen release from the reservoir host, followed by pathogen survival, development and dissemination outside of the reservoir hosts. Second, human and vector behavior determine pathogen exposure; specifically, the likelihood, route and dose of exposure. Third, genetic, physiological and immunological attributes of the recipient human host, together with the dose and route of exposure, affect the probability and severity of infection (16).

Over the last century, there has been an alarming increase in the number, frequency and diversity of zoonotic disease outbreaks. Caused by the spillover of pathogens from animal hosts to people, these events may have more than tripled in the last decade, with the number of new zoonotic diseases infecting people quadrupling over the same time period. Animal pathogens can infect humans directly through contact with wild or domestic animals or indirectly by transmission through intermediate hosts. These intermediate hosts act as "mixing vessels" that can lead to the genetic variation of diseases, enabling them to infect humans. And in modern times, contact with animals has dramatically increased, accelerating the risk of zoonotic disease outbreaks in humans.

Optimal rates of spill over occur once 40 percent of the forest cover disappears. "*That opens a window where you're going to see more germs jumping species*," according to Thomas Gillespie, associate professor in Emory University's Department of Environmental Sciences and Rollins School of Public Health. *"And tropical environments are at primary risk for pathogen spillover due to simple mathematics — there is a much richer diversity of species living in the tropics than in other environments."*

Although human-animal interactions are thought to be associated with zoonotic disease emergence, few studies have addressed the nature of specific interactions that occur between animals (particularly wild animals) and humans that lead to pathogen spillover. Bats (order Chiroptera) are reservoirs of a large number of zoonotic viruses, including coronaviruses (CoVs) that have caused disease outbreaks in human and livestock populations (19).

The latest COVID-19 pandemic is only the most recent example of how dangerous animal viruses can be on a global scale. Let's not forget how the Ebola virus went from bats to monkeys to humans in the 1970s causing an incredibly deadly haemorrhagic fever and still causes major outbreaks today. The current Coronavirus pandemic is an example that just can't be ignored. The spillovers will continue to happen as long as human kind keeps threatening the health of our ecosystems. (10) As have occurred in the past with other zoonotic conditions, the spillover of a new coronavirus, SARS-CoV-2, is now significant. Originating in bats, current and previous coronaviruses, such as SARS-CoV and MERS-CoV, are a matter of concern in the interaction between animals and humans, with the future concern of new epidemics in China and abroad(7).

Coronavirus and its transmission

Coronaviruses are a large family of viruses that infect birds and mammals. These types of viruses have been responsible for several outbreaks around the world, including the severe acute respiratory syndrome (SARS) pandemic of 2002-2003 and the current COVID-19 pandemic. There are seven coronaviruses known to infect humans but not all of them jumped directly from their original host to humans. Precursors to the SARS virus have been found in bats, but the virus hopped to civets (small, nocturnal mammals) before it infected humans. The SARS-CoV-2 virus, which causes COVID-19, also may have originated in bats but it's still unclear how the virus spilled over to humans (1). According to the National Foundation for Infection Diseases fact sheet, human coronaviruses were first identified in the 1960s. Seven coronaviruses that can infect humans have since been identified. These have included MERS-CoV, causing Middle East respiratory syndrome, or MERS, and SARS-CoV, causing severe acute respiratory syndrome, or SARS. The current pandemic is the result of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).Initial ideas about SARS-CoV-2 were that it originated from two hosts – bats and later from pangolins. To date, the full genomes of more than 17,000 SARS-CoV-2 viruses have been sequenced, but the exact origin is still unknown. This is important because to fully understand the properties of the virus, we need to know the animal host .This information may be critical to developing vaccines. It won't be easy. There is a very real possibility that the origin of SARS-CoV-2 may be a bat. But they are difficult to work on, given their habits of nocturnality, flight, and roosting in places that are hard to access. And there's a strong possibility that bat diversity is underestimated. This is a real problem given that viruses may be species-specific (13).

Transmission of the Coronavirus is usually via airborne droplets to the nasal mucosa in closed environments and through close contact between people, unwashed hands, and rarely as a result of touching contaminated surfaces. No other route of transmission of coronavirus infection has been documented, thus far. The virus replicates locally in cells of the ciliated epithelium, causing cell damage and inflammation.

Coronaviruses generally cause acute and chronic respiratory, enteric, and central nervous system diseases in many species of animals, including humans. Coronaviruses with more serious human diseases such as multiple sclerosis , hepatitis or enteric disease in infants.

Most humans in the world have encountered the coronavirus. In particular, the milder forms of the four strains of such viruses cause about one fifth of common colds without leaving permanent immunity. Other types cause endemic diseases in some animal populations. In spite of this, until less than two decades ago, all known human varieties caused such mild diseases that they did not stimulate further advanced coronavirus research (6). The virus is transmitted through direct contact with respiratory droplets of an infected person (generated through coughing and sneezing). Individuals can also be infected from and touching surfaces contaminated with the

virus and touching their face (e.g., eyes, nose, and mouth). The COVID-19 virus may survive on surfaces for several hours, but simple disinfectants can kill it (14).

Coronaviruses were identified in the mid-1960s and known to infect humans and other animals, including birds and mammals. Epithelial cells in the respiratory and gastrointestinal tract are the primary target cells. Due to these characters, viral shedding occurs via these systems and transmission can occur through different routes, i.e., fomites, airborne or fecal-oral. To date, seven coronaviruses have been shown to infect humans. Common human coronaviruses *Betacoronavirus* HCoV-OC43 and HCoV-HKU1, as well as Alphacoronavirus HCoV-229E, causes common cold and severe lower respiratory tract infections in infants and elderly, while *Alphacoronavirus* HCoV-NL63 is found to be a significant cause of (pseudo) croup and bronchiolitis in children. New zoonotic coronaviruses have emerged and caused outbreaks in humans; SARS-CoV (2002, *Betacoronavirus*, subgenus *Sarbecovirus*) and MERS-CoV (2012, *Betacoronavirus*, subgenus *Merbecovirus*). In late 2019, a novel coronavirus related to a cluster of pneumonia cases in Wuhan, China (2019-nCoV) was identified. After that the disease designed as COVID-19. The SARS-CoV-2 is closely related to SARS-CoV and genetically clusters within *Betacoronavirus* subgenus *Sarbecovirus*.During the COVID-19 outbreak, although earlier transmissions were from the animals after reporting four individuals from Seafood Wholesale Market, all other transmissions are believed to be from human to human. This mode of transmission was so active that within a few days, it flew to other countries. A recent study identified human to human transmission of COVID-19.Animal to human transmission can be reduced more quickly as compared to humans. In the recent outbreak, transmission from humans to humans increased many folds due to annual celebrations in China during which the movement of the masses increased a lot. Human to human transmission can happen in several ways. It can be through the droplets from the cough or sneeze, surfaces of public transport, restaurants, and other public places (toilets, elevators, bus stops) (7).

Origin of Covid 19 Coronavirus

The Origin of the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), the virus causing COVID-19 the first human cases of COVID-19, the disease caused by the novel coronavirus causing COVID-19, subsequently named SARS-CoV-2 were first reported by officials in Wuhan City, China, in December 2019. Retrospective investigations by Chinese authorities have identified human cases with onset of symptoms in early December 2019. While some of the earliest known cases had a link to a wholesale food market in Wuhan, some did not. Many of the initial patients were stall owners, market employees, or regular visitors to this market. Environmental samples taken from this market in December 2019 tested positive for SARS-CoV-2, further suggesting that the market in Wuhan City was the source of this outbreak or played a role in the initial amplification of the outbreak. The market was closed on 1 January 2020. SARS-CoV-2 was identified in early January and its genetic sequence shared publicly on 11-12 January. The full genetic sequence of SARS-CoV-2 from the early human cases and the sequences of many other viruses isolated from human cases from China and all over the world since then show that SARS-CoV-2 has an ecological origin in bat populations. Many researchers have been able to look at the genomic features of SARS-CoV-2 and have found that evidence does not support that SARS-CoV-2 is a laboratory construct. If it were a constructed virus, its genomic sequence would show a mix of known elements. This is not the case. Another coronavirus, SARS-CoV-1, the cause of the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003, was also closely related to other coronaviruses isolated from bats. These close genetic relations of SARS-CoV-1, SARSCoV-2 and other coronaviruses, suggest that they all have their ecological origin in bat populations. Many of these coronaviruses can also infect several animal species. For example, SARS-CoV-1 infected civet cats and then humans, while the virus causing the Middle East Respiratory Syndrome (MERS-CoV) is found in dromedary camels, and has continued to infect humans since 2012. All available evidence for COVID-19 suggests that SARS-CoV-2 has a zoonotic source. Since there is usually limited close contact between humans and bats, it is more likely that transmission of the virus to humans happened through another animal species, one that is more likely to be

handled by humans. This intermediate animal host or zoonotic source could be a domestic animal, a wild animal, or a domesticated wild animal and, as of yet, has not been identified. All the published genetic sequences of SARS-CoV-2 isolated from human cases are very similar. This suggests that the start of the outbreak resulted from a single point introduction in the human population around the time that the virus was first reported in humans in Wuhan, China in December 2019. (12)

SARS CoV

Over the last two decades, three new Coronaviruses with different genomic characteristics than those described above have emerged causing epidemics of such magnitude as to provoke a considerable global health concern. In 2003, the world experienced the Severe Acute Respiratory Syndrome (SARS) caused by a new coronavirus (SARS-CoV).
The SARS-CoV outbreak started in Guangdong, South China in late 2002, and spread rapidly around different parts of the world countries in many including Southeast Asia, Europe, South Africa and North America, most notably Toronto, Canada. (6) Detailed investigations found that SARS-CoV was transmitted from civet cats to humans; hence the source is zoonotic (5).

MERS CoV

After SARS, it was the turn of the Middle East Respiratory Syndrome (MERS) which occurred as a new challenging infection threatening the global health worldwide. MERS-CoV that first detected in 2012 in the Middle East. Both viruses are believed to have originated in bats, but human infections arise by transmission from intermediate hosts, masked palm civets (*Pauma larvata*) for SARS-CoV and dromedary camels (*Camelus dromedarius*) for MERS-CoV.(9)

The MERS Coronavirus (MERS-CoV), a lethal zoonotic pathogen that was first identified in humans in the Kingdom of Saudi Arabia in 2012, continues to emerge and re-emerge through intermittent sporadic cases, community clusters and nosocomial outbreaks . The first case resulting from MERS-CoV was identified in 2012 and defined in early research as a "SARS-like" or "SARS Arabica virus" . According to virologists, the zoonotic virus MERS-CoV emerged between the summer of 2007 and the autumn of 2012 through mutations and transmissions between various animals, and could have originated among bats and been transmitted by air or direct contact to humans from dromedary camels or camel products or other ways which also include water and insects but the ways of transmission are not yet full known and cannot definitely be established .Camels are suspected to be a reservoir of MERS-CoV since the virus has originated in the Middle East and some patients had had contact with camels prior to symptom onset . Further research has conducted that the MERS CoV has been quite frequent among camels and has been spreading from camels to humans for at least the last 20 years, although it is not yet clear how. Other camelidae animal such as alpacas and Lamas are probably involved too. (6) The investigation shows MERS-CoV was transmitted from dromedary camels to humans which again is a zoonotic origin (5).

SARS-CoV-2 (COVID-19)

The COVID-19 virus is a new virus linked to the same family of viruses as Severe Acute Respiratory Syndrome (SARS) and some types of common cold. Symptoms can include fever, cough and shortness of breath. In more severe cases, infection can cause pneumonia or breathing difficulties. More rarely, the disease can be fatal. These symptoms are similar to the flu (influenza) or the common cold, which are a lot more common than COVID-19. This is why testing is required to confirm if someone has COVID-19 (14).
In December 30th, 2019, while the MERS-CoV epidemic was still ongoing, a cluster of patients with pneumonia of unknown etiology were observed in Wuhan, China (Hubei Province). These individuals were associated in some way with visits to Wuhan market. In contrast to the SARS virus that was isolated 6 months after the SARS outbreak, Chinese scientists were able to isolate the new coronavirus (formerly 2019-nCoV, then SARS-CoV-2) as belonging to the Coronaviridae family, from respiratory samples of a Wuhan patient in just a few days. These results were gained on January 9th, 2020 and after sequencing the SARS-CoV-2 genome, were made available to the WHO on January 12th, 2020 . SARS-CoV-2 is classified as a novel Betacoronavirus belonging to the Sarbecovirus subgenus of Coronaviridae family. This virus has never previously been identified in humans. Nevertheless information coming from the scientific world is constantly evolving. (6)

The SARS-CoV-2 is an enveloped, spherical shape, single-stranded plus sense RNA virus with helical symmetry belonging to beta coronaviruses of Coronaviridae20. The virus has peplomers made up of glycoprotein projected over the envelope in a manner of crown (hence named corona), and these spike proteins help in binding with receptors present in the body of animals (bats, rodents, civets, cats, Malayan pangolins, camels, among other potentially competent hosts) and humans. Modifications at the level of spikes on receptor binding ligands are responsible for zoonotic spillover and crossing of the species barrier. As per high genomic similarities, it is suggested that SARS-CoV-2 producing COVID-19 in humans has its origin from bats as bats acted as natural ancestral host (20).

SARS-CoV-2 is the third zoonotic *Betacoronavirus*, and the seventh coronavirus to infect humans. The other two zoonotic viruses are SARS-CoV that first appeared in late 2002, and then spread from China in 2003.SARS-CoV and some of the other SARS-like bat coronaviruses are known to use angiotensin converting enzyme II (ACE2) as the cell receptor. Sequence studies found that the receptor-binding domain of the SARS-CoV-2 virus was sufficiently similar to that of SARS-CoV to indicate it could efficiently use the human ACE2 receptor for entry to human cells. The source of the SARS-CoV-2 virus, the original reservoir host, and the intermediate host (if indeed an intermediate host was involved) remain unknown. As the closest known relative to SARS-CoV-2 is bat/Yunnan/RaTG13/, it strongly suggests that the reservoir host is a bat. However, the receptor-binding domains of the SARS-CoV-2 virus and the bat/RaTG13 share low sequence similarity, indicating that this bat virus was not the direct origin of the human outbreak virus. Pangolins have been suggested as the intermediate host; although genomic sequence studies of viruses isolated from pangolins only share about 90% homology overall, the pangolin CoV is identical to SARS-CoV-2 at all six key residues in the receptor-binding domain. This would suggest that pangolins may have contributed to the origin of SARS-CoV-2, perhaps via recombination with a bat virus. (9)

II. Conclusion

The review done has focused on understanding and defining the nature of interaction between humans and animals and its potential for zoonotic disease spillover to humans. Simultaneously, to find out whether humans

understand the health risk associated with this constant interaction with animals. Results from this study also reveals the increased zoonotic hazards that causes many different types of illness in people and animals, ranging from mild to serious illness and even death. Almost two-thirds of human infectious diseases originate from pathogens shared with wild or domestic animals. All available evidence to date suggests that the virus has a natural animal origin and is not a manipulated or constructed virus.

Zoonotic diseases are not only responsible for billion cases of illness in people but also millions of deaths every year, and these emerging zoonoses finally is threat to the whole world impacting the health, economy, ecology and environment, entire food system, employment, population and many other areas worldwide.

All the available evidences and previous studies done for COVID-19 suggest that SARS-CoV-2 has a zoonotic source. Since there is usually limited close contact between humans and bats, it is more likely that transmission of the virus to humans happened through another animal species, one that is more likely to be handled by humans. SARS Covid 19 directly or indirectly is a pandemic that is affecting human life and the global economy.

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Previous studies also shows that the awareness about zoonosis and its impact has become essential and is of great concern. The researches reveal the exposure to blood or other secretions during hunting and butchering of bushmeat or through bites and scratches from wild animals are considered a primary risk factor for a broad spectrum of other zoonotic disease transmission to humans.

The evidence proves the risk of zoonotic disease transmission from animals to humans. Research has shown that most zoonotic diseases remain neglected because of the lack of adequate diagnostic laboratory services and the fragmented collection of data that cannot be used to inform any recommendations. Findings and the evidence of SARS-CoV-2 outbreak shows that although the risks to human infections from animals remains a threat, the population and health services in many developing countries remain unprepared for the next outbreak yet the cost of managing such infectious disease outbreaks is greater than the cost of avoiding them . Overall, findings suggest that knowledge about Zoonoses is not adequately filtering down to the communities to impact human behaviors regarding wildlife interaction, despite awareness about the existence of specific Zoonoses like SARS, MERS, and SARS-CoV2. This is a reflection of the international and national focus and investment in certain diseases of public health concern and the neglect of endemic zoonotic diseases that significantly contribute to the disease burden in these communities. This also has implications for zoonotic disease spread and highlights the extent to which education and dissemination of information can mitigate future outbreaks of such zoonotic diseases.

The results from this study clear upon the fact that there is interaction between humans and wildlife among communities at the human wildlife interface. This interaction is largely driven by human needs and creates a potential threat for disease spillover to humans due to persistent hunting-bushmeat activities, any kind of experimental activities related to animal or any kind of interaction with animals or wildlife. The study basically focus upon the zoonotic origin of SARS CoV-2 (COVID -19) .Most of the previous studies and research findings would suggest that pangolins may have contributed to the origin of SARS-CoV-2, perhaps via recombination with a bat virus. Zoonotic diseases are a major human health concern. Zoonotic spillover events are increasing in frequency and it's difficult to predict when and where they will end. This pandemic of COVID -19 which is zoonotic in origin is a lesson to us. We should learn from this zoonotic pandemic that with unity and mutually interconnected way, we can overcome the health, social and economic impacts of this global pandemic and can contribute to preventing zoonotic outbreaks in future. The health of our planet and animals has become a reflection of public health, and needs to be addressed urgently. Preventing zoonotic

diseases requires coordinated actions by government authorities responsible for human and animal health on a worldwide level.

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Cite this article as :

Dr. PreetiJeet Bansal, "A Review COVID 19 : A Zoonotic Disease and a Relentless Widespread Global Pandemic", International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 7 Issue 5, pp. 356-367, September-October 2020. Journal URL : https://ijsrst.com/IJSRST207579