

COVID-19: Zoonotic Transmission and Impact on Livestock

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Abstract

In recent a major problem that would not be only noticed but also affect a huge level of human as well as animal population that is COVID-19. The COVID-19 virus (also called SARS-CoV-2) is a new virus in human population. Recently Spread of COVID-19 occurs through human-to-human transmission and may be spread in animals as a result of close contact with human being. Hence, it is utmost necessary to know the proper path of zoonotic transmission of covid-19 so there are possible to control the rapid spread and circulation of this so called virus in an effective way throughout the globe. Increasing globalization and the importance of the human-animal-ecosystem interface both factors resulting in evolution and emergence of pathogens.

Keywords: COVID-19; Emergence; Globalization; Zoonotic; Ecosystem

Abbreviations: COVID-19: Coronavirus Disease 2019; SARS: Severe Acute Respiratory Syndrome; OIE: World Organization for Animal Health; RBD: Receptor-Binding Domain; MERS-CoV: Middle East Respiratory Syndrome Coronavirus; ACE: Angiotensin-Converting Enzyme.

Introduction

Over the past decade, there was observed a significant increase in the circulation of infectious agents. With the spread and emergence of zoonoses, epizootics, and epidemics, the risks of pandemics became more and more censorious. Emergence of new life threatening viruses in recent like covid-19, development of antimicrobial resistance, increased environmental pollution and many of multifactorial chronic diseases were harsh the Human and animal health. Here a required step of about better knowledge of causes and consequences of certain human activities, lifestyles, and behaviors in ecosystems is decisive for a diligent interpretation of disease dynamics and to handle public

policies in a better and effective way. Coronaviruses (CoVs) infect man as well as domestic and wild animal species and usually infections remain sub-clinical in most cases [1-3]. The clinical form varies from enteritis in cattle, horses and swine, upper respiratory tract disease in cattle, dogs, felines, and poultry, and common cold to highly lethal respiratory infections in humans [4,5].

Animal to human transmission can be reduced more quickly as compared to humans [6]. In the recent outbreak, dissemination from humans to humans increased many folds due to annual celebrations in China during which the movement of the masses increased allot. Human to human dissemination can happen in several ways. It can be along the droplets from the cough or sneeze, surfaces of public transport, restaurants, and other public places (toilets, elevators, bus stops). The World Organisation for Animal Health (OIE) has maintained that though the novel coronavirus pop up from an animal source the predominant route of dissemination of COVID-19 is from human to human.

It held that now that the coronavirus infections are widely distributed in the human population there is a probability for some animals to become infected through close contact with infected humans [7].

Zoonotic Transmission

All available affirmation for COVID-19 suggests that SARS-CoV-2 has a zoonotic source. Most of these types of viruses have an origin in animals. The possible animal source of COVID-19 has not yet been established but research is ongoing. As coronaviruses have a broad animal host range, several animal species harbour these pathogens, and only a few of them get a severe infection [8,9]. It suggested the probability of host jumping by a coronavirus from bats to pigs by crossing the species barrier either by genetic recombination or by creating changes at the level of the receptor-binding domain (RBD) [10,11]. Among the four genera in the Coronaviridae family, Alphacoronavirus and Betacoronavirus usually infect mammals and have possible bat origin, while Gammacoronavirus and Deltacoronavirus contaminate birds, fishes, and mammals and are assumed to have swine origin [9,12,13]. The genus Betacoronavirus possess potential zoonotic pathogens like SARS-CoV and MERS-CoV which have bats as primary host and palm civet cat and dromedary camels as intermediate hosts, respectively [14-16]. Amongst CoVs, recent zoonotic ones such as SARS-CoV, MERS-CoV, and SARS-CoV-2 gained higher importance due to the severity of disease in humans and their global spread [3].

The exposure of novel CoVs and their wide host range may be due to vulnerability of the replicase enzyme, RNA dependent RNA polymerase, polybasic furin cleavage site, and O-linked glycan's, deficit of proofreading mechanism, a higher rate of mutations in the RBD of spike gene and genetic recombination [17-19]. Researchers also revealed that SARS-CoV and SARSCoV-2 (2019-nCoV) both use ACE2 as a similar cell entry receptor [20]. Many of Literature documented that a few of the bat origin SARS-CoVs were likely capable of infecting human beings. As seen earlier, bats were found involved in the transmission of SARS-CoV and MERS-CoV, thereby researchers predicted the role of bats in the origin and transmission for the current pandemic of SARS-CoV-2 [20-23]. In short, bats appears as the natural reservoir or source of origin for SARS-CoV-2 [2] that causes zoonotic infection in humans through an intermediate host yet to be explain with recent investigations on pangolins, ferrets and possibly snakes. However, the future investigations might reveal the actual intermediate host of SARS-CoV-2 responsible for zoonotic transmission [11,20]. There is isolation SARS-CoV-2 from dogs also reported [7]. Minks raised in farms have also been identified with the virus. Most likely, they have been infected by farm workers. In a few illustration, the minks

that were infected by humans have transmitted the virus to other people. These are the first revealed cases of animal-to-human transmission.

Impact on Livestock

The livestock sector is largely knocked by COVID-19. There are endorsed appraisal have not yet been possible, but current observations reveal disruptions to livestock value chains and much more. Past epidemics stipulate these disruptions are likely to grow, along with their dire, socio-economic consequences. Fortunately, actions can be taken to protect this sector and its activities, services and products upon which the world relies [24]. At a time when the nation is focused on protecting and saving human beings, we seem to have forgotten that India's animal population is almost the same as its human population—1.2 billion people and 1.3 billion livestock and poultry. While we are rightly distraught about the shortage of PPE, ventilators, testing kits, hospital beds, and trained frontline health workers to conflict the COVID-19 crisis, there is another growing worry on the animal front too [25]. Among large animals, bovine coronaviruses (BoCoVs) have zoonotic potential as being isolated from asymptomatic children and also found affecting several domestic and wild ruminants, in which calf diarrhea in neonates, bloody diarrhea in adult cattle and respiratory form of shipping fever in all age groups of cattle are universal implications [23,26].

Reduced Approach to Animal Feeds

Physical distancing and prerequisite for additional personal protective equipment are reducing the competence of industrial feed enterprises. Movement restrictions and illness are emanate in labour shortages and reduced supply of raw materials or other ingredients. Disruption of contribute routes has further delayed feed supply. In Argentina – the world's biggest soymeal exporter – restrictions have diminished soymeal supply to feed factories by half, which could affect global trade proceed. Movement restrictions also derange transhumance, which cripples pastoralists' ability to feed their animals [27].

Reduced Approach to Inputs and Services

Movement restrictions and interference of national and international trade routes is curbing farmer access to breeding materials and substitution stocks (e.g. day-old chicks and semen). This can compromise sales for input providers. The disruption of public services (e.g. food safety perusal and animal health extension services), combined with interrupted remittance and use of vaccines and medicines is increasing the likelihood of new epidemics, including those involving animal diseases that cause major livestock

losses (e.g. African swine fever in East and Southeast Asia) and eruption of diseases transmissible to humans. Import restrictions will have greater impact on areas which depend on imports to sustain production or rely on meat and dairy imports for consumption (e.g. large parts of Africa and small island developing states) [24,28].

Recommended Actions

While persuading harmony with public health measures to suppress COVID-19 transmission, certain actions can take form of policies and responses parse to fit into national frameworks. The below-mentioned actions are recommended for consideration to attenuate the impact of COVID-19 on the livestock sector. Implementing these actions will require international coordination and resources to tackle covid-19. It is still recommended that people who are ill with COVID-19 and people who are at risk limit contact with intimate and other animals. When handling and attentive for animals, basic hygiene measures should always be implemented. This incorporates hand washing after handling animals, their food or proffer, as well as avoiding kissing, licking or sharing food. The stress of animals packed adjacent together, or birds caged with beaks touching, debilitate the immune system. The animals and birds deficit fresh air and sunlight, and such conditions cause them to be susceptible to viral contamination.

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