

## Impact of Zoonotic Diseases on Pregnant Women

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### ABSTRACT

This chapter investigates the relationship between zoonotic diseases and pregnant women, addressing the complex implications for maternal and fetal health. The introductory section highlights the prevalence of interactions between animals and humans as well as the possible hazards associated with zoonoses. The chapter defines zoonotic diseases and provides examples of over 200 cases of various infections. A particular focus is placed on the modalities of transmission, emphasizing the intricacy of vector-borne transmission, foodborne routes, direct and indirect contact, and airborne distribution. With a focus on the possible effects of antibiotic usage in food-producing animals, antimicrobial resistance appears as a complicated concern in the prevention of zoonotic diseases. This study examines the increased vulnerability of expectant mothers to zoonotic diseases, considering the immunological modifications that occur throughout pregnancy. A significant aspect of this chapter is the in-depth analysis of specific zoonotic diseases, including Toxoplasmosis, Listeriosis, Q Fever, and Plague. These sections clarify the causative agents, modes of transmission, and the profound impact on pregnant women and their developing fetuses. Case studies give real-world context, emphasizing the challenges in diagnosis and implications for public health policies. The global incidence and trends of zoonotic diseases are scrutinized, with an emphasis on regional variations and emerging infectious threats. The prevalence of zoonoses in different geographical locations is discussed, considering the ecological conditions and human-animal interactions that contribute to disease spread. This chapter concludes by supporting a One Health approach, recognizing the link between human, animal, and environmental health. It underscores the importance of understanding physiological changes during pregnancy, the risks to the developing fetus, and the imperative of preventive measures. It also contributes to a holistic understanding of the complex dynamics of zoonotic diseases in pregnant women and underscores the global collaboration required for effective prevention and control.

**Key words:** Zoonosis, Zoonotic diseases, Pregnancy, Pregnant women, Fetus, Antimicrobial resistance, One Health, Physiology

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### 1. INTRODUCTION

Animals provide many benefits to humans. Many people interact with animals daily, both at home and in the outside environment. Millions of households have pets. Many people are connected to animal husbandry. Humans cannot avoid contact with animals as they are essential parts of their lives. However, animals can sometimes carry harmful germs that can spread to people and cause illness – these are known as zoonotic agents. They can cause many types of illnesses in people and animals, ranging from mild to serious illness and even death. Animals can sometimes seem healthy, but they carry germs and spread diseases in humans, depending on the zoonotic disease (Cross et al. 2019).

Infections that can spread spontaneously between animals and people are called zoonotic illnesses or zoonoses. There are almost 200 known zoonotic diseases. Various pathogens, including bacteria, viruses, parasites, and fungi can bring on these illnesses. Some examples of zoonotic disease include Rabies, Psittacosis, Blastomycosis, Histoplasmosis, Trichinosis, Coccidiomycosis, and many intestinal illnesses acquired from animals i.e., birds and reptiles transfer salmonella to humans. They pose serious health concerns to expectant mothers and their growing fetuses. To protect maternal and fetal health, it is essential to comprehend how zoonotic infections affect pregnant women (Chowdhury et al. 2021).

### 1.2. DEFINITION OF ZOOTIC DISEASES

Zoonotic diseases are contagious illnesses that can be spread directly or indirectly from animals to people. These illnesses may be spread by several means, such as contact with sick animals, ingesting tainted food or water, or coming into contact with vectors like ticks and mosquitoes. Rabies, toxoplasmosis, brucellosis, and influenza are only a few examples of common zoonotic diseases. Some zoonotic diseases, i.e., Q fever, Anthrax, Brucellosis, and plague may fall in the category of Bioterrorism diseases. This is because there is some evidence of these diseases being used as bioweapons, depending on the ease of spread and severity of illness and death they can cause. Some diseases, for instance HIV, started as zoonosis but later mutated into human-only strains. Other zoonoses can cause repeated disease outbreaks, such as salmonellosis and Ebola virus disease.

Antimicrobial resistance is a complicated factor in the prevention and control of zoonoses. The use of antibiotics in animals bred for food raises the potential for drug-resistant strains of zoonotic pathogens capable of spreading quickly in humans and animals.

These diseases pose a serious threat to the public's health due to the variety of zoonotic infections and their modes of transmission. Due to physiological changes that can influence a woman's immune system and make her more susceptible to certain diseases during pregnancy, pregnant women are thought to be more sensitive to zoonotic infections.

### 1.3. IMPORTANCE OF STUDYING ZOOTIC DISEASES IN PREGNANT WOMEN

For many reasons, it is crucial to research how zoonotic illnesses affect expectant mothers. First, pregnant women undergo special immunological changes throughout pregnancy that make them more prone to

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specific infections. Further, zoonotic illnesses can infect the growing fetus by breaching the placental barrier, resulting in unfavorable consequences such as congenital abnormalities, stillbirths, preterm births, or low birth weight (Aslan and Balaban 2020).

Many women, especially Asian and African women are not even aware of the zoonoses and their effect on their fetus due to the lack of education and poor medical system in these continents. Women doesn't undergo proper checkups during pregnancy. Due to this, many zoonoses that doesn't show any significant symptoms or even are asymptomatic, cause serious mental, physical, and physiological issues in the developing fetus and even cause death. As almost all zoonoses can be treated if detected at an early stage and both mother and fetus can be saved from long lasting damaging effects. It is necessary to research the cause, effects and the prevention and the treatments of zoonoses. This study will provide knowledge about the zoonoses, how they transfer to humans, how they pose serious threats to pregnant women and are fetal to their fetus, and how it is prevented and treated (Aslan and Balaban 2020).

Developing preventive measures and suitable medical interventions can be made easier by being aware of the hazards posed by zoonotic infections during pregnancy. Furthermore, early diagnosis of zoonotic illnesses in pregnant women and recognition of their symptoms might lead to better maternal and fetal health outcomes (Aslan and Balaban 2020).

### 1.4. OVERVIEW OF THE CHAPTERS STRUCTURE

This chapter is set up to give a thorough overview of how zoonotic illnesses affect expectant mothers. We will start by looking at specific zoonotic illnesses, such as toxoplasmosis, listeriosis, and Q fever, which seriously harm pregnant women. We will examine the causes, methods of transmission, potential effects on both the mother and the fetus for each condition, and its preventions and treatments.

The incidence and trends of zoonotic diseases in pregnant women worldwide will be examined, offering information on regional variances and newly developing infections. We will also talk about how important it is to take preventative steps, such as knowledge and good hygiene habits, to lessen the dangers connected to zoonotic illnesses during pregnancy.

Additionally, case studies will be included in this chapter to show actual instances of zoonotic infections in pregnant women and their results. In addition, the difficulties in diagnosing zoonotic infections that affect pregnant women and the ramifications for public health policy will be covered.

By the end of this chapter, readers will understand how zoonotic illnesses affect expectant mothers and the need for One Health strategy to address these issues successfully.

## 2. UNDERSTANDING THE ZOONOTIC DISEASE

### 2.1. DEFINITION AND EXAMPLE OF ZOONOTIC DISEASES

As was already noted, zoonotic diseases are infectious illnesses that can spread naturally between humans and animals. The word "zoonosis," which refers to the infection's animal origins, is derived from the Greek words "zoo" (animal) and "nosos" (disease).

These illnesses are caused by a wide variety of pathogens, including bacteria, viruses, parasites, and fungi, each with specific traits and modes of transmission. Zoonotic infections may impact many bodily systems and have clinical presentations that range from minor flu-like symptoms to serious, potentially fatal conditions.

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### 2.1.1. EXAMPLES OF ZOOTIC DISEASES INCLUDE

#### 2.1.1.1. RABIES

A viral infection typically spreads to people through the bite of an infected animal, most frequently a dog, a bat, or other wild animal. Once symptoms manifest, rabies affects the central nervous system and is nearly invariably fatal.

#### 2.1.2. TOXOPLASMOSIS

A warm-blooded animal infection brought on by the parasite *Toxoplasma gondii* that is frequently observed in cats. Humans become infected when they consume contaminated food or come into contact with infected cat feces. Because it can be passed on to the fetus during pregnancy, toxoplasmosis poses serious hazards.

#### 2.1.3. AVIAN INFLUENZA (BIRD FLU)

A viral infection that mostly impacts birds, especially poultry. Rarely avian influenza viruses can translocate to humans, causing serious respiratory conditions and possibly igniting pandemic outbreaks.

#### 2.1.4. BRUCELLOSIS

A bacterial infection spread to people by animals like sheep, goats, cattle, and pigs. The *Brucella* bacteria can enter the body by ingesting infected dairy products or through skin wounds.

### 2.2. MODES OF TRANSMISSION FROM ANIMALS TO HUMANS

Zoonotic diseases can be transmitted to humans through various routes, depending on the specific pathogen and its reservoir host. common modes of transmission include:

#### 2.2.1. DIRECT CONTACT

direct physical contact with diseased animals or their bodily fluids, blood, saliva, mucus, urine, and feces that transfer to humans through contact with animals such as bites, scratches, or handling contaminated animals.

#### 2.2.2. INDIRECT CONTENT

Contacts with contaminated objects or environments, such as contaminated water, soil, or surfaces. This has happened while roaming or living in the infected area or by handling contaminated objects. Pet baskets, chicken coops, aquariums, infected soil and pet water and food dishes can spread diseases to humans. Veterinary doctors, farmers and zoo workers are at high risk of developing zoonoses while handling animals or animals related objects. They can also transfer these diseases to other humans. Contaminated water resources through manure can also contain a wide variety of zoonotic parasites and therefore rise the risk of transferring it to humans.

#### 2.2.3. VECTOR BORNE

Transmission through the bite of vectors like mosquitoes, ticks, or fleas that acquire the pathogen from infected animals and then pass it on to humans. Almost 17% of all infectious diseases are vector borne

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causing the death of more than 700000 people around the globe annually. Examples of vector borne diseases include yellow fever, malaria, dengue, zika virus transferred by mosquitos. Fleas can transfer plague and toxoplasmosis to humans and Lyme disease is transferred to human by ticks.

### 2.2.4. FOODBORNE TRANSMISSION

Ingestion of contaminated food products, especially undercooked meat, unpasteurized milk, or raw fruits and vegetables.

### 2.2.5. AIRBORNE TRANSMISSION

Inhalation of infectious particles (e.g., droplets or aerosols) expelled by infected animals or through close contact with their respiratory secretions.

## 2.3. COMMON SOURCES OF ZOOTIC INFECTION

Certain animals act as primary reservoirs for zoonotic pathogens, and interactions with these animals or their by-products can lead to human infections. common sources of zoonotic infections include.

### 2.3.1. DOMESTIC ANIMALS

Pets like dogs and cats can transmit various zoonotic diseases to humans through bites, scratches, or exposure to their feces. Well known diseases transferred through dogs and cats are rabies, toxoplasmosis, scabies, and cat scratch disease.

### 2.3.2. LIVESTOCK

Animals raised for food production, such as cattle, pigs, and poultry, can be sources of zoonotic infections like Salmonella, E. coli, and brucellosis.

### 2.3.3. WILDLIFE

Wild animals, especially rodents, bats, and birds, can carry numerous zoonotic pathogens that pose risks to human health. Common among them are rabies and plague.

### 2.3.4. VECTOR

Mosquitoes, ticks, and fleas can act as vectors, transmitting zoonotic diseases from animals to humans. Among them are toxoplasmosis, Lyme disease, malaria, and dengue.

Understanding these modes of transmission and common sources of zoonotic infections is essential for preventing and controlling these diseases, especially in vulnerable populations such as pregnant women (Mor and Cardenas 2010).

## 3. ZOOTIC DISEASES AND PREGNANCY

Public health has been concerned about zoonotic illnesses, infections that can spread from animals to people. Due to physiological changes during pregnancy that can influence their immune systems and increase susceptibility to certain diseases, pregnant women are particularly vulnerable to zoonotic infections (Mor and

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Cardenas 2010). Females generally manifest diseases differently than males because of the hormonal and anatomical factors. Social, cultural, and behavioral factors are also to be considered. For example, in many areas around the globe, women tend animal herds are more likely to get zoonoses like rift valley fever and Q fever. Likewise, women are more susceptible to get zoonoses who get pregnant after kidney transplantation. Zoonotic diseases are seen to be transferred from mother to fetus, if women get disease, it during pregnancy. West Nile virus encephalitis causes premature delivery with neonate having neurologic sequelae, which is transferred from mother to fetus. This zoonosis doesn't transfer through breast milk. Toxoplasmosis, a zoonotic protozoal disease, cause of abortion of pregnant females, both humans and other animals worldwide. The infection may pass through the placenta and cause blindness, mental retardation, and encephalitis in a congenitally infected child. Cats and other felids are the only known host for this parasite. It transfers to humans by ingestion food or water contaminated by infected cat feces. Neosporosis, another zoonotic protozoal disease, causes abortion of both domestic and wild animals. Neosporosis hasn't been found to be transferred to humans. Zoonoses pose serious threats to fetus when get transferred to mother and through mother to developing fetus. When left untreated cause severe infections during pregnancy that leads to mental retardation, low birth weight, preterm birth, learning problems and even fetal death. This review aims to investigate the susceptibility of pregnant women to infections, the physiological changes that affect susceptibility, and the dangers that zoonotic illnesses bring to the growing fetus.

### 3.1. VULNERABILITY OF PREGNANT WOMEN TO ZOONOSIS

Pregnancy causes special immunological condition in women that make them susceptible to infectious diseases. This the reason women are considered special population group. This concept creates a myth about pregnancy as a state of immunological weakness. But the studies show that pregnancy does not imply more susceptibility to infectious diseases, instead there is a modulation of the immune system which leads to differential responses depending on the stages of the pregnancy and on the microorganisms. Pregnant women are more susceptible to malarial infection during the first half of the pregnancy and the risk slowly drops during the second half.

Pregnancy puts the immune system through a complex process that involves immune system modification to stop the body from rejecting the growing fetus (Mor and Cardenas 2010). Pregnant women may be more susceptible to infections due to this modulation's potential reduction of immune responses to infectious pathogens. Progesterone and estrogen fluctuations during pregnancy also affect immunological responses, affecting how well the body can fight infections. Pregnancy-related physiological changes in the digestive and respiratory systems may also enhance an individual's susceptibility to infection (Smith and Mulvey 2018).

### 3.2. PHYSIOLOGICAL CHANGES DURING PREGNANCY THAT AFFECT SUSCEPTIBILITY

Dynamic physiological changes in the female body aid in the growth of the fetus. The heart pumps more blood to satisfy the needs of the fetus and placenta, increasing cardiac output, which may affect the movement of infectious pathogens through circulation (Smith and Mulvey 2018). The clearance of respiratory infections may be impacted by changes in lung function and ventilation brought on by the expanding uterus. Changes in renal function and hormonal changes may also impact the body's reaction to infections. Additionally, changes in the gut flora brought on by pregnancy may affect a person's susceptibility to gastrointestinal infections.

Due to these physiological changes, the pregnant mother becomes more susceptible towards certain infections caused by pathogens i.e., hepatitis E virus, malaria parasites, and influenza virus. All these

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pathogens linked to zoonoses are known to pass from mother to fetus, causing significant health threats. Hepatitis E, a zoonotic disease, known to be transferred by eating undercooked meat of infected animals, cause more severe infections in pregnant women than non-pregnant women. Vertical transmission from mother to infant is also studied. It may cause fulminant hepatic failure and death in the patient. This severity of infections in pregnant women is known to be linked with hormonal changes especially progesterone and estrogen, during pregnancy that subsequently led to immunological changes (Smith and Mulvey 2018). Stress is another factor that bring about physiological changes in pregnant women and indirectly affect the immunity of expected women. This increases the susceptibility towards infections. The relationship between stress and birth outcomes is unclear, but it may alter health behaviors such as sleeping pattern and eating. Sleeping and eating patterns are known to be linked with immune response and intensify the vulnerability of infections. Stress can also bring about hormonal imbalance, another factor in rising infections in pregnant women (Smith and Mulvey 2018).

### 3.3. RISKS TO THE DEVELOPING FETUS

Pregnant women who catch zoonotic illnesses run a severe risk to their growing fetus. Congenital infections and developmental abnormalities can result from certain zoonotic diseases that can pass through the placental barrier and directly infect the fetus (Liu et al. 2006). Preterm birth and low birth weight are risk factors for severe maternal sickness brought on by zoonotic infections and are linked to poor neonatal outcomes. Sometimes zoonotic infections can cause fetal death in utero, stillbirth, or neonatal death. Some zoonotic infections may have poor growth and development that affect the fetus's long-term health, manifesting later in life.

The placental outer membrane is made up of blastocysts, the specialized layer of cells called trophoblasts. Trophoblast is characterized by the regulation of blood and nutrient supply from mother to fetus. The permeable trophoblast plays a significant role in transferring infections from the mother to fetus. Toxoplasmosis, a systematic infection, during pregnancy can cause placental infections and affect the mother–child relationship. Placental membrane is specifically permeable towards *Toxoplasma gondii*. These zoonotic diseases then transfer from mother to fetus, causing serious health problems for the fetus i.e., mental retardations and even stillbirth. Infection in the later stage of pregnancy is asymptomatic but gives rise to neurological and retinal damage later in life. The severity of disease is also related to maternal immunosuppression commonly due to diseases like AID and diabetes and to some extent to placental damage. Clearly placenta plays a vital role in transmission and expression of infections in fetus.

## 4. ZOONOTIC DISEASES AFFECTING PREGNANT WOMEN

Zoonotic illnesses, or infections spread from animals to people, present serious hazards to expectant mothers and their growing fetuses. Toxoplasmosis, listeriosis, and Q fever are the three main zoonotic diseases this review of the literature analyses that afflict pregnant women. The review examines the causes, mechanisms of transmission, effects on expectant mothers and fetuses, and management techniques for pregnancy.

### 4.1. TOXOPLASMOSIS

#### 4.1.1. CAUSATIVE AGENT AND TRANSMISSION THE PROTOZOAN PARASITE TOXOPLASMA GONDII

causes toxoplasmosis. Cats are the main hosts, excreting oocysts contaminating the soil and water. Humans can contract the virus by consuming oocysts from tainted food or water or by a mother's fetus vertically contracting it during pregnancy (Dubey 2010).

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### 4.1.2. IMPACT ON PREGNANT WOMEN AND THE DEVELOPING FETUS

Pregnant women with toxoplasmosis may experience mild flu-like symptoms. If the infection is acquired while pregnant, it could seriously affect the fetus. Congenital toxoplasmosis can cause developmental defects in the baby, such as neurological deficits, visual issues, and other issues (McAuley et al. 2012).

### 4.1.3. PREVENTION AND MANAGEMENT DURING PREGNANCY

Avoiding contact with cat excrement, eating only properly prepared meat, and maintaining good hygiene are all preventive precautions. Additionally, pregnant women should refrain from gardening or handling dirt without gloves. Early detection and quick drug administration can help lower the chance of vertical transmission to the fetus (Holliman 2017).

## 4.2. LISTERIOSIS

### 4.2.1. CAUSATIVE AGENTS AND TRANSMISSION

The bacterium *Listeria monocytogenes*, which is frequently found in soil, water, and some animals, is what causes listeriosis. Consuming contaminated food, such as unpasteurized dairy products and ready-to-eat meals, is how the disease is transmitted to humans (Maertens de Noordhout et al. 2014).

### 4.2.2. IMPACT ON PREGNANT WOMEN AND THE DEVELOPING FETUS

Pregnant women with listeriosis may experience mild flu-like symptoms. The developing fetus, though, is more in danger from infection. Pregnancy-related infections have been linked to miscarriage, stillbirth, early birth, and serious newborn infections (Mylonakis et al. 2011).

### 4.2.3. PREVENTION AND MANAGEMENT DURING PREGNANCY

Avoiding high-risk foods, thoroughly cooking meat and eggs, and ensuring excellent food safety and cleanliness are all preventive actions. Pregnant women should consult a doctor immediately if they see any symptoms of listeriosis. Early detection and proper antibiotics can enhance maternal and fetal outcomes (Charlier et al. 2017).

## 4.3. Q FEVER

### 4.3.1. CAUSATIVE AGENTS AND TRANSMISSION

The bacterium *Coxiella burnetii*, which is frequently found in the placenta, labour fluids, and milk of infected animals, is what causes Q fever. Through direct contact with diseased animals or inhalation of polluted aerosols, the disease can be transmitted to people (Angelakis et al. 2014).

### 4.3.2. IMPACT ON PREGNANT WOMEN AND THE DEVELOPING FETUS

Q Flu-like symptoms might develop in pregnant women with a fever. However, infection during pregnancy may result in unfavourable consequences such as spontaneous abortion, stillbirth, and underweight babies (Anderson et al. 2013).



### 4.3.3. PREVENTION AND MANAGEMENT DURING PREGNANCY

Avoiding contact with diseased animals and their reproductive products and maintaining excellent cleanliness are preventive measures. Pregnant women should exercise caution while handling cattle and stay away from areas where Q Fever is known to be common. Pregnant women diagnosed with Q Fever can benefit from early diagnosis and appropriate antibiotic therapy (Porten et al. 2006).

### 4.4. PLAGUE

Plague is a life-threatening zoonotic disease caused by gram-negative bacteria called bacillus *Yersinia pestis*. The three most common forms of plague, i.e., septicemic, pneumonic, and bubonic are causing endemics in certain geographical areas and cause outbreaks worldwide. Plague is known as bioweapon worldwide, but its application on pregnant women as a war weapon is lacking evidence. Nowadays plague is being spread by infected fleas and rodents i.e., rats. Pregnant women having a plague can have adverse pregnancy outcomes. Evidence is available of this zoonotic disease to be transferred to fetus. Infection in pregnant women cause fetal tachycardia, spontaneous abortion, and fetal distress. More severe outcomes of plague infection in expected women cause birth defect in fetus, preterm birth, neonatal infections, and pregnancy loss.

## 5. GLOBAL INCIDENCE AND TRENDS OF ZOONOTIC DISEASES

Zoonotic illnesses, or infections that can be passed from animals to people have serious effects on global public health. Frequency and intensity of zoonoses is more in under developing countries than in developed countries. The reason behind this is poor health services, and poor sanitary conditions. In many under developing countries where livestock plays a significant role in the economy of the country, zoonoses are a common cause of infections in people. This is due to the reason; people are uneducated about the cause and effect of zoonotic diseases. Bad hygienic conditions in the area where livestock are being bred and poor handling of objects related to animals in the farms, households, and veterinary hospitals. Availability of proper veterinary aid to the animals in the zoos, farms, and households are also significant in the spread and transmission of zoonotic illnesses. Pregnant women are susceptible to infectious diseases including zoonotic infections. Many reasons for this rise in vulnerability include unawareness to zoonosis, bad hygiene, and non-availability of proper and on time medical aid. Specifically focusing on the frequency of these illnesses in various countries and the effects of new zoonotic diseases on pregnant women, this literature review looks at the global incidence and trends of zoonotic diseases.

### 5.1. PREVALENCE OF ZOONOTIC DISEASES IN DIFFERENT REGIONS

Geographical location, ecological conditions, and human-animal interactions all play a role in the frequency of zoonotic illnesses spread throughout the world in many different places. Research studies and surveillance reports offer important insights into the prevalence and distribution of zoonotic illnesses in various geographic areas.

According to studies, some areas are more susceptible to particular zoonotic diseases because of their particular animal populations and environmental conditions. For instance, temperate regions with suitable vector habitats have higher prevalences of vector-borne zoonotic diseases like Lyme disease and the West Nile virus (Brisson et al. 2012; Medlock et al. 2013). On the other hand, areas where raising

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livestock is common may see epidemics of zoonoses like brucellosis and Q fever (Dean et al. 2012; Di Nardo et al. 2018).

Zoonotic illnesses represent a significant burden in developing nations with frequent close encounters between humans and animals. Due to the close contact between people, domestic animals, and wildlife in these areas, neglected tropical zoonoses like rabies and leptospirosis are common (Hotez et al. 2014; Costa et al. 2015).

It is essential to understand the regional distribution of zoonotic diseases to develop targeted prevention and control methods and allocate funds for surveillance and research to lessen their influence on human and animal health.

### 5.2. EMERGING ZOO NOTIC DISEASES AND THEIR IMPACT ON PREGNANT WOMEN

Emerging zoonotic diseases may be defined as infections that are new to a population or have existed but are fast growing in certain geographical ranges. Recent quickly growing zoonotic outbreaks include avian influenza, west Nile virus, and malaria. Emergence of zoonoses in pregnant women is of special concern. Studies show antibiotic resistance, organ transplantation, and certain immunosuppression diseases i.e., AIDS and diabetes. Pregnant women are more susceptible to emerging infectious diseases. In general, women manifest diseases differently than man because of hormonal and anatomical factors. The change in hormones and immune responses become more severe during pregnancy that make women to get infections more easily. Behavioral, social, and cultural factors are also to be considered in this regard. i.e., the women who tend animal herds are more likely to get rift valley fever and Q fever than the women linked to other professions. This shows that the emerging risks of zoonoses are linked to animal husbandry and agriculture. Cooperation should be developed between the owners and workers of farms and animals and the veterinarians to minimize the risks of the spread of zoonoses among the animals and transmission to humans.

Public health authorities are extremely concerned about newly discovered or re-emerging infections with the potential to spread zoonotic illnesses. Due to their altered immunological status and potential negative effects on the developing fetus i.e., mental retardation, low weight birth, stillbirth, preterm birth, and neonatal deaths, many disorders have the potential to affect pregnant women significantly.

The advent of zoonotic illnesses like the Ebola virus disease, Middle East Respiratory Syndrome (MERS), and severe acute respiratory syndrome (SARS) have brought attention to the threat that zoonotic viruses pose on a global scale (Zumla et al. 2016; Ng et al. 2016; Barry et al. 2017). These viruses can cause serious disease progression in pregnant women, resulting in unfavorable pregnancy outcomes like miscarriage, premature birth, and maternal mortality.

Zika virus, another emerging zoonotic disease, garnered attention for its association with congenital Zika syndrome, characterized by microcephaly and other neurological abnormalities in newborns (Rasmussen et al. 2016). Pregnant women infected with the Zika virus during pregnancy are at risk of vertical transmission to the fetus, resulting in devastating consequences for the developing brain and nervous system.

### 6. CONCLUSION

Wild birds become significant in spreading and re-emerging zoonoses like Lyme diseases and west Nile virus in different geographical locations. Birds' migration establishes a mechanism in spreading diseases. Birds cannot transmit Lyme disease directly, but they can play a major role as a disperser of tick carrying

pathogen of Lyme disease. In the case of the west Nile virus, birds are the main amplifying host of the virus.

The effects of newly developing zoonotic illnesses on expectant mothers highlight the necessity of effective surveillance systems, early detection techniques, and quick reaction times. Monitoring and controlling emerging zoonoses is crucial to protect maternal and fetal health worldwide. This requires cooperation with infectious vulnerabilities, researchers, and healthcare professionals.

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