Journal of Bioterrorism & Biodefense

Review Article Open Access

Risk of Bioterrorism Diseases during Pregnancy South Asian Social Factors that Influence Infectious Diseases

Mary Twain*

Department of Gynaecology, Huazhong University of Science and Technology, Wuhan, Hubei, China

Abstract

We carried out a review using a PubMed search and other methods, summarising the literature discussing the vulnerability of pregnant women to infectious disorders and the severity of the subsequent disease. Studies were considered if they provided data on the likelihood of infection or the prognosis of disease in pregnant women. 85 studies were included after 1454 abstracts were examined in total. Data on the prevalence of cases in pregnant women, infection rates, risk factors for the severity or complications of the disease, and maternal outcomes were extracted. Pregnancy is linked to increased severity of various infectious diseases, including measles, smallpox, hepatitis E, hepatitis, and influenza. There is also some evidence for increased severity of some diseases during pregnancy. There is some evidence that measles and smallpox are becoming more severe. With advanced pregnancy, disease severity tends to be more severe. Although the evidence is sparse, pregnant women may be more prone to contracting malaria, HIV infection, and listeriosis. These findings highlight the significance of early detection and treatment of suspected cases of hepatitis E, HSV, malaria, and influenza during pregnancy.

In collaboration with numerous local and international NGOs, South Asian nations have created widespread initiatives to prevent infectious diseases, such as routine immunisation, vaccination, and the distribution of critical medications. HIV/AIDS prevalence has been relatively low in the majority of South Asian nations up to this point, but problems including widespread poverty, food insecurity, illiteracy, poor sanitation, and societal stigma around AIDS are posing strong obstacles to efforts to stop the spread of this pandemic. In addition, the comeback of tuberculosis, the appearance of drug-resistant strains, and the coepidemic of TB and HIV pose an increasing threat to the inadequate healthcare system. The illness burden in the countries is transitioning epidemiologically from infectious diseases, which still account for about half of the total disease burden, to noncommunicable diseases. Despite the second-highest incidence of infectious diseases in the world after Africa in South Asia, no study has been done on the socioeconomic factors that influence infectious diseases locally. In particular, HIV and tuberculosis are discussed in relation to numerous issues involving the social determinants of infectious diseases in South Asian nations. Additionally, it aims to offer a foundation for creating future prevention and intervention plans that are more effective.

Keywords: Measles; Smallpox; Hepatitis E; Influenza

Introduction

An increased susceptibility to infection is frequently believed to be linked to pregnancy. A therapeutic abortion was advised for pregnant tuberculosis patients during the 19th and early 20th centuries, for instance, because it was believed that pregnancy had a negative impact on the progression of the disease. But as radiography became more widely used in the second half of the 20th century, it became obvious that these factors—rather than pregnancy itself—were more crucial in determining the course and prognosis of the disease than the severity of the disease, the radiographic pattern, and individual susceptibility. After the development of efficient treatment, pregnant women with tuberculosis have a typically positive prognosis, just as non-pregnant women. Peter Medawar, a transplant immunologist, postulated in the 1950s that a general maternal immune suppression occurs during pregnancy to ensure tolerance of the semi allogeneic foetus [1]. Since Medawar's time, our understanding of the immunological changes that take place during pregnancy has advanced significantly and now includes more sophisticated theories of immune alteration. There is proof that adaptive immune responses are compromised, which could account for the decreased viral clearance. Evidence also points to an enhanced innate response, which may be a compensating immune defence to safeguard the expectant mother and the foetus and which may suggest reduced vulnerability to initial infection.

The word "social determinants" in the context of public health refers to a group of elements that together are referred to as social determinants of health and contribute to the social patterning of health, disease, and sickness (SDOH). In order to assist nations and global health partners in addressing the social determinants contributing to sickness and health inequity, the WHO established the Commission on Social Determinants of Health (CSDH) in March 2005 [2]. The commission sought to raise awareness of the social determinants of health and the need for better social circumstances for health, especially among the most disadvantaged populations, among the scientific community, governments, and academia. Over one-fifth of the world's population resides in South Asia, sometimes referred to as the Indian subcontinent. According to studies, a significant portion of health issues are caused by a combination of interrelated socioeconomic factors. Poverty, illiteracy, gender inequality, and fast urbanisation are the main societal variables that make nations susceptible to infectious disease outbreaks. All of these issues are widespread in South Asia and have mostly gone neglected up to this point. Even while chronic noncommunicable diseases (NCDs) are quickly becoming more

***Corresponding author:** Mary Twain, Department of Public Administration, Huazhong University of Science and Technology, Wuhan, Hubei, China, E-mail: maykt@432.edu

Received: 04-Jul-2022, Manuscript No: jbtbd-22-71240, **Editor assigned:** 06-Jul-2022, PreQC No: jbtbd-22-71240 (PQ), **Reviewed:** 20-Jul-2022, QC No: jbtbd-22-71240, **Revised:** 22-Jul-2022, Manuscript No: jbtbd-22-71240 (R) **Published:** 29-Jul-2022, DOI: 10.4172/2157-2526.1000303

Citation: Twain M (2022) Risk of Bioterrorism Diseases during Pregnancy South Asian Social Factors that Influence Infectious Diseases. J Bioterr Biodef, 13: 303.

prevalent in this area, infectious diseases continue to account for a sizable amount of the burden of disease. According to studies, TB cases were concentrated in places with a lot of people living there and poor environmental and sanitary conditions [3].

In South Asia, the infectious diseases of poverty still provide significant challenges to achieving the health-related MDGs. Although the healthcare systems in South Asian nations have made significant strides over the past 20 years, the benefits are still highly unequally distributed. The infant survival rate in South Asia is still the second lowest in the world, and the primary factors contributing to this situation are largely social and economic, including hunger, poverty, and other related issues including unsanitary living conditions and a lack of clean water [4]. Around 700,000 children under five die from pneumonia each year in South Asia, one of the developing world's 98 percent of children who die from the disease.

A growing body of research indicates that treating HIV and AIDS is not merely a disease-fighting measure, but also a means of tackling the social and economic causes that are impeding attempts at prevention and intervention. Studies have established that the TB-HIV coinfection is a socially complicated disease, and that the only effective ways to eradicate it are to improve housing, transportation, and nutrition in addition to health. Incidence rates are clearly higher in places with average and lower socioeconomic levels [5]. South Asia continues to be a high risk area despite having lower incidence of HIV and AIDS than other emerging nations due to the lack of attention given to social variables. HIV has contributed to the rapid increase in tuberculosis incidence and prevalence, and it has been discovered that DOTS (directly observed treatment, short course) programmes in South Asia are less effective when there is TB/HIV coinfection. HIV increases susceptibility to TB infection and severely decreases the immunological response to TB. People are therefore more at risk when TB and HIV coexist than if either of the two diseases were present alone.

Major Infectious Diseases in South Asia: Social Context

The majority of studies in industrialised nations like Europe concentrate on the socioeconomic factors that influence the development of chronic diseases like diabetes, cancer, and cardiovascular disease because infectious diseases only account for a small portion of global disease burden. 63 percent of all deaths in Africa, on the other hand, are caused by communicable diseases [6]. There are sadly no major scientific research on the socioeconomic drivers of infectious diseases in nations where infectious diseases are prevalent, such as South Asia or Africa. Free trade and economic reunification are advancing, raising the level of living in Asia and Africa as a whole.

The bulk of infectious diseases in South Asia can be directly linked to poverty-related factors such malnutrition, congested living quarters, lack of access to healthcare, poor sanitation, and hygiene. According to WHO, diseases brought on by poverty account for 45 percent of all illnesses in the world's poorest nations, and tuberculosis, malaria, and HIV/AIDS collectively account for about 18 percent of all ailments. The transmission of TB infection is known to be greatly influenced by socioeconomic and environmental factors, including poverty, contaminated air and water. TB patients are demonstrated to experience financial hardship owing to loss of income, and as a result, they must sell their personal belongings.

The average South Asian TB patient misses three to four months of work and up to 30% of their household's annual income. In LMIC countries, there is an alarmingly high risk of dying from reasons associated with low socioeconomic status, such as a lack of access to clean water, inadequate sanitation, and unsafe sex. Diarrhoea continues to be the major cause of child fatalities in South Asia, where nearly one billion people lack access to proper sanitation. Poor living conditions and the frequency and intensity of diarrheal episodes are strongly correlated, particularly in young children under the age of five [7].

Bangladesh is a country that frequently experiences flooding, which has been proven to raise the incidence of water-borne illnesses during the monsoon season each year, to which young children are especially vulnerable. One-third of all child deaths in Bangladesh are attributable to diarrhoea, which claims about 230,000 lives each year in rural areas. Malaria was almost completely eliminated from India in the early 1960s, but the disease has returned and is now a significant public health issue, with the vast majority of people living in malaria-prone areas. In 2009, India was thought to be the country that spread malaria the most in the South and South East, with an estimated 90–167 million cases and 125,000 annual deaths in the South Asian region.

Influenza

There is strong evidence that suggests pregnant women are more susceptible to developing more serious influenza infections. Pregnancy-related cardiopulmonary adaptive changes, such as elevated heart rate and stroke volume as well as decreased pulmonary residual capacity, may raise the risk of hypoxemia and contribute to the observed rise in influenza severity. Maternal mortality rates were 27% in the 1918 pandemic (and 50% when pneumonia was present), and 50% of deaths among women of reproductive age occurred in pregnant women in the 1957 pandemic. 509 of the 788 influenza cases in pregnant women reported to the CDC between April and August 2009, according to surveillance data from the 2009 influenza A pandemic, required hospitalisation. Thirty-five (6%) of the 509 pregnant women who were hospitalised died, and 115 (22.6%) were admitted to the intensive care unit. Despite the fact that severe illness was documented in women who presented in all three trimesters, the severity of illness was higher for those in their third trimester, which was also the trimester in which a higher percentage of intensive care unit (ICU) admissions occurred. Also more common in pregnant women was primary viral pneumonia [8]. Despite only making up roughly 1% of the population in the US, pregnant women made up 5% of all pandemic influenza deaths in that country. In interpandemic periods, pregnant women with confirmed or suspected influenza had higher rates of hospital admissions and doctor visits than the general population, and the illness was more severe in the later stages of pregnancy. Pregnancy did not appear to be linked to complicated influenza B infection, in contrast to influenza A. Regarding case fatality rates, a retrospective study of pregnant and postpartum women from a low income country discovered an association between H1N1 infection in pregnancy and an increase in mortality rate (25 percent versus 8 percent in nonpregnant women). Studies from Canada and Lithuania, however, did not observe an increased case fatality in pregnant women, which is probably due to the impact of early antiviral therapy.

Listeriosis

Listeria monocytogenes is primarily a food-borne disease that can contaminate a wide range of uncooked foods, including meat, vegetables, unpasteurized milk, and soft cheeses. Listeria infections are infrequent earlier in pregnancy and most frequently develop during the third trimester. While severe infection is rare and there have been no recorded maternal deaths among pregnant hospitalised women, infection may be asymptomatic or manifest as a flu-like sickness. But listeriosis prefers the placentofetal unit and, depending on the stage of pregnancy, can cause miscarriage, stillbirth, premature birth, or

catastrophic neonatal illness. Over a two-year period, a laboratory surveillance system found that one-third of all instances of culture-confirmed listeriosis were caused by pregnancy. In the US, 246 instances of culture-confirmed listeriosis were reported in 1986. An active monitoring analysis of those cases indicated that 67 of them involved pregnant women, with 22 percent of perinatal cases resulting in stillbirths and neonatal deaths. Pregnant women accounted for 17% of the 762 listeriosis cases recorded in 10 US geographic areas between 2004 and 2009, according to active population-based surveillance. Hispanic women were especially at risk, possibly as a result of their nutritional habits. According to estimates, invasive listeriosis linked to pregnancy is between 13 to more than 100 times more common than it is in the general population. However, more than half of all cases of pregnancy were linked to a neonatal case, indicating that foetal and neonatal sequelae of listeriosis frequently bring to light pregnancy cases that could otherwise go unnoticed and may lead to miscarriage.

NTDs

The NTDs are a collection of 17 parasitic, bacterial, and viral illnesses that affect underprivileged and disadvantaged people in developing nations. Around a billion people are affected by NTDs worldwide, and 9 million people die from them every year. The majority of these diseases are found in rural and underdeveloped metropolitan areas in South Asia, sub-Saharan Africa, and Latin America. In both wealthy communities in developing nations and developed nations, NTDs are reported to be almost non-existent. Different sociodemographic and economic variables are thought to be responsible for the disproportionate burden of NTDs among the poor.

The most prevalent NTDs in South Asia include leishmaniasis, lymphatic filariasis, hookworm infection, ascariasis, and trichuriasis.

NTDs seriously affect household income and productivity in addition to taking lives. A research on lymphatic filariasis (LF) in India found that $842 million is lost annually owing to treatment costs and lost productivity, which equates to $2 per resident living in endemic areas. Women with LF may lose their jobs and face family abandonment, according to research done in Sri Lanka.

Other factors that enhance vulnerability to NTDs and obstruct preventative efforts include poor diet, societal stigma, lack of access to healthcare, and health illiteracy. The Millennium Development Goals (MDGs) are known to be significantly hampered by NTDs, and extensive efforts to eradicate some of the very prevalent NTDs are currently being implemented in South Asia. NTDs are generally avoidable illnesses as long as their socioeconomic causes are properly recognised and handled. It can be very effective to address these social causes of NTDs while utilising the available methods to fight NTDs. NTDs are illnesses that affect communities who are socially excluded and tend to deprive people of their basic capacities, which contributes to poverty. By affecting livelihoods, physical health, and socioeconomic well-being, these diseases present huge obstacles to progress. Infectious pathogens reduce the body's supply of nutrients through interfering with nutrition metabolism, which weakens the immune system. The goals of reducing poverty and promoting human development are unlikely to be accomplished if these diseases continue unrecognised and untreated.

Varicella

In contrast to children, adults with primary varicella have a 25-fold higher risk of complications, with varicella pneumonia being the most common serious consequence in adults. Estimates for pregnancy range from 0.8 to 7/10,000, which is similar to estimates for all adults. Early reports made the assumption that being pregnant, especially in the third trimester, increased the likelihood of developing severe chickenpox. Reviews of published case reports or brief case series served as the bulk of this evidence's foundation. Pregnant women had a higher fatality rate of 35% compared to non-pregnant individuals in a 1990 study of 34 published cases of varicella pneumonia. The risk of varicella pneumonia among 43 pregnant women with varicella was reported by Paryani and Arvin to be 9%, with one fatality and one needing ventilator support. In the 99 instances, 46 of the patients were female, and of these, 28 were pregnant (21 in the third trimester), suggesting a higher incidence of varicella pneumonia during pregnancy. The death rate (of 10 percent) was, however, not higher in non-pregnant individuals.

Recent studies do not support a greater severity of varicella during pregnancy. Only one out of 144 women in a New York City poll passed away. In a German-British research that tracked 1373 pregnant women with chickenpox, there were no maternal fatalities recorded. Recent research has benefited from earlier detection and treatment, better supportive care, and the use of antiviral medications, all of which have improved the outlook for varicella pneumonia generally.

Discussion

The lack of adequate and trustworthy data is the primary reason for the few limitations this study has. First of all, it only includes those five nations—India, Pakistan, Bangladesh, Nepal, and Sri Lanka—partly because they account for around 87 percent of South Asia's population and share some of the same health and illness patterns. Second, although there are many other infectious diseases on the list that are also regarded as being very serious, including viral hepatitis, malaria, varicella, NTDs, and pneumonia, this paper focuses primarily on TB and HIV due to the incidence rates and potential effects on society and the economy.

Conclusion

The discriminated experience a disproportionate burden of disease since diseases do not discriminate against individuals, but people do. A simple indexing of the "diseases of wealth" and the "diseases of poverty" will not be sufficient to lessen the burden of infectious diseases that plague poor countries unless the underlying social, cultural, and attitudinal restrictions are addressed with due priority. South Asian nations must develop strategic social and health policies that prioritise social aspects, particularly ensuring social stability, promoting social inclusion, and encouraging community involvement, in order to increase public awareness of social issues and reduce health difficulties. Lessening stigmatisation and discrimination against infectious diseases and emphasising the needs of the most vulnerable populations, particularly women and children, are of utmost importance and can play a significant role in reducing and halting the spread of deadly but curable diseases like TB and AIDS. According to the study's findings, addressing socioeconomic factors is crucial for long-term intervention and the prevention of the spread of infectious illnesses, particularly TB and HIV, which are currently and are anticipated to remain two of the region's top public health challenges. Pregnancy-related vaccinations have been shown to be both safe and efficacious for a variety of infectious diseases. Its positive effects might not only assist the mother but also the baby in the long run by lowering foetal and placental inflammation. The creation of vaccinations for other key infections, such HSV or malaria, will be crucial. Preventing complications and maternal mortality also depends on the early detection and effective treatment of infectious illnesses during pregnancy. Increased adoption in this demographic will depend on more research on the safety of new vaccines and treatments during pregnancy.

Pregnancy-related immune changes may hinder the clearance of infections, increasing the severity of sickness for a number of pathogens. For influenza, malaria, hepatitis E, and HSV infection, the evidence is particularly strong; measles and smallpox, on the other hand, have more circumscribed evidence. The research is not in favour of varicella becoming more severe during pregnancy. Pregnancy-related higher susceptibility to first infection is not as well supported by the findings. Although the outcomes for the mother are not worse, pregnant women may be more prone to contracting HIV and listeriosis. This conclusion is based on a paucity of data. Pregnancy does not appear to increase the risk of toxoplasmosis.

Acknowledgement

The authors acknowledge the tremendous intellectual contributions of their colleagues who graciously assisted in the accomplishment of this work.

Conflict of Interest

The author has no known conflicts of interested associated with this paper.

References

1. Finland M, Dublin TD (1939) Pneumococcic pneumonia complicating pregnancy and the puerperium. JAMA 250: 1027–1032.
2. Cervantes Gonzalez M, Launay O (2010) Pandemic influenza A (H1N1) in pregnant women: impact of early diagnosis and antiviral treatment. Expert Rev Anti Infect Ther 8: 981–984.
3. Mosby LG, Rasmussen SA, Jamieson DJ (2011) 2009 pandemic influenza A (H1N1) in pregnancy: a systematic review of the literature. Am J Obstet Gynecol 205: 10–18.
4. Siston AM, Rasmussen SA, Honein AM (2010) Pandemic 2009 influenza A(H1N1) virus illness among pregnant women in the United States. JAMA 303: 1517–1525.
5. Jamieson DJ, Theiler RN, Rasmussen SA (2006) Emerging infections and pregnancy. Emerg Infect Dis 12: 1638–1643.
6. Neuzil KM, Reed GW, Mitchel EF, Simonsen L, Griffin MR (1998) Impact of influenza on acute cardiopulmonary hospitalizations in pregnant women. Am J Epidemiol 148: 1094–1102.
7. Lindsay L, Jackson LA, Savitz DA (2006) Community influenza activity and risk of acute influenza-like illness episodes among healthy unvaccinated pregnant and postpartum women. Am J Epidemiol 163: 838–848.
8. Rolland Harris E, Vachon J, Kropp R (2012) Hospitalization of pregnant women with pandemic A(H1N1) 2009 influenza in Canada. Epidemiol Infect 140: 1316–1327.