

# A Critical Account Of A Recent Outbreak Of Infectious Disease

Posted on October 28, 2019

## Introduction to the Zika Virus

The recent outbreak selected for this paper is the “Zika virus.” Zika virus is caused by a mosquito-borne virus called “flavivirus.” The name of the disease is based on the Zika forest in Uganda, where it was first discovered in the late 1940s. The very first outbreaks of the Zika virus were recorded in Asia, Africa and the American continents. However, at that time, the viral disease was only characterized by a mild illness such as body pain, rashes or fever. Then, by 2007, a large and serious outbreak of the disease was reported in the Island of Yap and with the passage of time, the viral disease has gained momentum.

## Symptoms and Clinical Presentation

The symptoms of Zika virus are the same as dengue. They include fever, muscle pains, headache, pain behind the eyes and skin rashes. These symptoms are usually mild and may develop over a week. That is why, many times, those who get infected cannot tell that they are suffering from a disease. However, the consequences of being infected can be very serious in the case of pregnancy. According to WHO research and scientific conclusions, infection during pregnancy can lead to an abnormality called “microcephaly”(Stevenson). This abnormality can lead to serious brain defects and neurological disorders. Scientific research has shown that Zika virus can also lead to Guillain-Barre syndrome.

## Guillain-Barré Syndrome

Guillain-Barre syndrome is a rapid-onset weakness of the muscles, which is caused by the immune system damaging the peripheral nervous system. Initial symptoms include the sensation of pain in the body, followed by muscle weakness, which usually begins with the feet and hands. If not treated, this syndrome can be threatening to life, and it can lead to serious abnormalities in blood pressure and heart rate. This syndrome can cause temporary or long-term paralysis as well. The Guillain-Barre syndrome is rare. It has been reported that it occurs in one person in 100,000 every year. Despite this, the onset of the Zika virus and its links with the mentioned syndrome has caused hysteria. The link between Zika virus and Guillain-Barre syndrome was first proposed in 2014 (Rozé et al., 2017). The international medical community has great concerns that with the spread of Zika, this syndrome might also increase and may not remain as rare as it is at present.

A South American country, El Salvador, has reported an increase in Guillain-Barre cases in 2016, such that there have been forty-six reported patients of this syndrome in only one month. The number only increased when the number of patients increased to 3,836 in just one to two months (Rozé et al., 2017). There have been many studies conducted by scientists to affirm whether or not Zika has any connection with the Guillain-Barre syndrome. For example, in Colombia, patients who were diagnosed with the above-mentioned syndrome were evaluated. Neurological experts and specialists had these patients undergo clinical and neurological evaluation. Similarly, blood and urine samples were also obtained from them to further testify Zika virus. Surprisingly, all the patients who were being testified to resided near areas that had a high frequency of mosquito-borne endemics, especially at a time when the Zika virus was rampantly high. Thus, it was concluded by the Pan American Health Organization that there is a connection between the Zika virus and the Guillain-Barre syndrome (Parra et al., 2016).

Many symptoms of the Guillain-Barre syndrome have still been detected in Brazil, the country probably most hit by the Zika virus, even after the scientific community has done its best to limit the scope of the infection. There are still many reported cases of patients of all ages and genders who are suffering from neurological abnormalities due to GBS (Rosario et al., 2016). Zika virus, in Brazil, was mistaken for dengue virus. Symptoms such as fever and body rashes were regarded as the hose of the dengue virus. Nevertheless, after inspection and proper diagnosis, it was discovered that Brazil is not being plagued by the familiar disease but by the Zika virus. It mostly affected pregnant women, and such women complaining of rashes, pain and fever were enrolled at the Oswaldo Cruz Foundation (Brasil et al., 2016). After their enrollment, proper medical testing began. Blood serum and urine specimens were obtained from the patients.

## Pregnancy Studies and Infant Outcomes

Out of all the women enrolled, 53% were identified as being Zika-positive. They had a virus either in their blood, urine, or both. Forty-five women had positive Zika virus in their urine, and 54 women showed positive results in their blood samples (Brasil et al., 2016). The infants born to the Zika-positive women also showed signs of deformities. There were four infants who were born with microcephaly. Some infants had smaller heads than average, but the size was proportional to the body length and weight of the infant. Others had extremely small heads in relation to their weights and lengths (Brasil et al., 2016).

Of all the infants born, which totaled a number of 117, 49 infants showed a pattern of abnormal growth in their first month. This is because they were exposed to the Zika virus while still being in the womb of their mothers. All these abnormal patterns affected their central nervous systems (Brasil et al., 2016). Disruption of brain tissue and cerebral bleeding leading to seizures and muscle contractures were also identified and widely reported in Brazil, especially in Rio de Janeiro. In addition to the Zika virus affecting pregnant women and their infants, as studies have shown, the virus is also causing Guillain-Barre syndrome. This is yet another serious issue that needs an immediate resolution

to be countered.

## Treatment of Guillain-Barré Syndrome

In the early stages of the disease, patients are hospitalized so that their symptoms can be monitored. There has not yet been any cure for Guillain-Barre syndrome; there have been two treatments devised that can slow down the severity of the disease and maximize the chances of recovery. One is “plasma exchange,” and the other is “intravenous immunoglobulin.” In the former, donor plasma replaces the liquid portion of the patient’s blood. Since antibodies are contained within that plasma, they can be easily removed from the blood and speed up the recovery process. In the later, large amounts of donor antibodies are injected into the bloodstream of the patient. Both these procedures serve the goal of reducing the effect of our antibodies and minimizing the chances of the Guillain-Barre syndrome causing much damage to one’s immune system (Van Doom et al., 2010).

## Evidence Linking Zika and Guillain-Barré Syndrome

It has been asserted by many proponents of the medical society that the Zika virus is behind the GBS. Zika virus, which has its roots in Uganda, was confirmed to have reached the Americas by 2015. That is when it was realized how dangerous the virus can be and how easily it can spread all across the world simply by the mobility of infected people. That is also when the WHO declared the Zika virus a public health emergency of international concern. It was declared a pandemic, which could cross international borders and cause diseases everywhere.

## Risks to Pregnant Women and Infants

According to numerous studies, the Zika virus affects more pregnant women than it does other people. This makes the Zika virus a very serious issue as it puts not only the health of the mother at risk but also that of her unborn child. The infection is responsible for thousands of babies born with underdeveloped brains. Doctors have labeled it as a “pandemic in progress,” and some have advised women in the most affected areas to delay getting pregnant. As there has been no vaccine or drug medicine created to effectively treat the virus, doctors and medical researchers have advised patients to drink as much water and fluids as they can.

However, despite one person taking precautions, there is every chance of a womb getting infected. This results in the birth of a baby whose head is abnormally small because the infection has hindered the brain from growing normally (Rasmussen et al., 2016). This can affect the baby’s future as it can lead to the development and cerebral disabilities. According to various reports, many deaths of such babies have also been reported. It was later found through medical study that those who died had the virus not only in their brain but also in their placenta and amniotic fluid (Oliveira Melo et al., 2016).

Experts have contemplated that the Zika virus may also be linked with other complications one may face during pregnancy, such as miscarriage, premature birth or stillbirth. The virus, like many viral infections, can be transmitted from one partner to another during sexual intercourse. It lingers in the blood and can be caused to other people through bodily contact or exchange of bodily fluids such as blood or semen (Mansuy et al., 2016). After being infected, studies have shown people can transmit the disease to other people for a week.

## International Travel and Transmission Controls

Zika virus has caused such havoc in the international community that many countries have banned blood donations for a month after visiting any such country most likely to be infected. Similarly, doctors and medical experts have advised people to take part in safe sexual intercourse activities as a compulsory precaution against the disease.

The World Health Organization has cautioned that there is a very likely chance that the Zika virus will spread all across the American continent except Canada. The virus has been reported in many countries in South America, such as Colombia, Mexico, El Salvador and Jamaica. The spread of the virus in the United States can mostly be attributed to travelers. The people who have traveled to areas affected by the virus have brought it back with them to different parts of the States. Most cases of Zika virus in the United States were reported in New York, Hawaii and Minnesota. Apart from the United States, where the virus was carried to by travelers, there are many other countries around the world where factors other than the Zika virus itself are susceptible to cause this disease.

The WHO has warned countries that are the most vulnerable to dengue fever to be on the lookout for the Zika virus. Assistant director general at the World Health Organization, Bruce Aylward, has declared that all those countries that host the *Aedes aegypti* mosquito, which carries both the Zika and the dengue virus, must be on high alert. According to him, dengue fever can also lead to serious Zika infection as well. This revelation has been a distress call for the international community as more than a third of the world's population resides in the dengue belt. Such regions include South Asia, Sub-Saharan Africa, South East Asia and most parts of South America (Gulland). One of such countries is Pakistan, located in South Asia. According to various medical experts working on Zika virus in the country, dengue mosquitos are most likely the vehicles for Zika virus (Butt et al., 2016).

With the panic that this virus has created all across the world, WHO has been issuing precautions to travelers on how to avoid getting this infection because one infection can lead to many others getting infected. Despite these precautions and abstaining from any such activity that might get others infected, this virus is rampantly spreading. Instead of precautions, concrete methods must be devised to stop this virus and save a generation that is being born with serious abnormalities.

## Treatment and Vaccine Development

In this case, it is urgent that immediate action must be taken to prevent and manage the outbreak of this disease. As a vaccine for the Zika virus has not yet been created, symptoms can be treated with the intake of fluids, oral anesthetics and plenty of rest for the patient. If one is diagnosed with Zika virus, then one must avoid further mosquito bites as the virus can be passed from the blood of the infected person to the mosquito, which will only result in more infections, as the infected mosquito will infect more people. Further mosquito bites can be prevented by using an effective mosquito repellent, wearing full clothes and applying permethrin onto the skin.

While one may take precautions to ensure one's health, there are fourteen vaccine developers who are currently working on the development of 23 vaccine projects. Seven of them are located in the United States while others are located in France, Austria, Brazil and India. The creation of vaccines is definitely the best way to stop this menace. Different countries are contributing to the creation of vaccines. Many pharmaceutical companies have taken up the task of investigating the elements best required to formulate a vaccine that can control the Zika virus.

## Reproductive Health Challenges

In 2016, health ministers from various South American countries made public recommendations to postpone pregnancies until there was no absolute method to counter Zika. However, these pregnancies are very difficult to control, as 56% of them are simply unintended. Due to a lack of sex education in such regions, women often experience unintentional pregnancies. Furthermore, since voluntary abortion in many South American countries is illegal, women are left with no choice but to go through the pregnancy, which ultimately increases the risk of giving birth to a child suffering from the Zika virus (Focosi et al., 2016).

## Mosquito Control Strategies

According to many scientists, the best way to control the Zika virus in the long run is to stop the breeding process of the mosquitos carrying this virus. One way to counter their breeding is not allowing them any space to breed. All surfaces, which can hold water must be cleaned as such mosquitoes usually breed in places holding water. One strategy that can be employed is to manage the environment in order to prevent mosquitoes from breeding and spreading diseases. To do this, authorities must manage water supply and water storage systems must be cleaned and maintained properly. Solid waste management must be conducted as well. This also includes clean of streets and good maintenance of building structures.

Interestingly, America's Silicon Valley tech company has come up with an innovative idea to counter the growing menace. An approach has been presented which has pulled many people towards its

reliability. According to this approach, millions of mosquitos must be infected inside a lab with Wolbachia bacteria. This bacteria is able to change the reproductive ability of males. Afterwards, only those mosquitos will be released which do not bite. They will then mate with female *Aedes aegypti* mosquitos. After mating, the females will not be able to lay any eggs, and even if they do, they will not be able to hatch. This is how scientists have planned to eliminate the threat of the Zika virus. Scientists have been studying different ways to control the population of mosquitos by using Wolbachia bacteria. A number of successful experiments have also asserted its effectiveness.

## Public Health and Globalization

Apart from the virus itself, public health is a priority for the international community and different methods are being sought out to control the pandemic. However, increased globalization is posing a risk and hinting towards the spread of diseases. Apart from devising the methods discussed above, the international community should also restrict international travel. Travelers have introduced the infection even in those areas that were the least likely to be caught in this infection. Those who are traveling to infected regions must be tested upon their arrival to their homeland. If there are any traces of the disease found in their system, then they must be treated so that further transmission of the virus may stop. Furthermore, many people misunderstand that *Aedes* mosquitos only bite during the night. One should know that they are also very active during the daytime, so one must use a mosquito repellent in the day as well.

## Integrated Vector Management

The World Health Organization has voiced support for the Integrated Vector Management (IVM) program. The World Health Organization has defined this program as a rational decision-making process for the best use of resources for vector control. The ultimate goal of this program is to prevent the transmission of diseases, which are caused and spread by vectors such as dengue, malaria or Zika virus (Gyawali et al., 2016). This program will require collaboration with the health sector, utilization and mobilization of all resources and the use of operation research, which will further guide an evidence-based decision-making process.

## International Coordination and Research Priorities

Given the vast and quick spread of Zika, international organizations need to work with country-based organizations, health experts and funding institutions and consider which issues need to be addressed. At the given time, only those issues need to be highlighted and prioritized which can directly lead to fighting the Zika virus. Thorough research is needed because the factors that have served as drivers for the sudden emergence and outbreak of this disease are unknown, complex and multifaceted. This knowledge gap has caused many implications for public health all around the

world, the most serious being life-threatening risks to pregnant women and their unborn children (Gyawali et al., 2016).

Besides the approaches mentioned above in this paper, another technique that can be used is to modify the mosquitoes genetically and give rise to the mosquitoes whose offspring are not able to survive in the near future. This will ultimately affect the growth of the mosquitoes and play a role in countering the deadly diseases they cause.

Many compounds are being tested, and many drugs are also under production, which can surely limit the Zika virus if they are approved as beneficial by the scientific community. Many antibodies are also being discovered, such as ZIKA-117. It has been derived from the blood of those people infected by Zika virus. It has been noted that this antibody has the potential to protect developing fetuses in mice from the virus. However, it would be most beneficial if such an antibody is discovered which can also protect developing fetuses in humans (Rather et al., 2017). Despite this, the development of a vaccine that can give immunity to humans in the long run would be a better option than a short-term antibody treatment.

## Community Participation in Prevention

While the scientific community is working on finding and creating various methods to control and manage vector breeding, individuals must also take part in contributing towards controlling the Zika virus. People should contribute towards the cleanliness of their society to limit the breeding ground for mosquito larvae. Zika virus, since it is transmitted through bodily fluids such as semen, sexual intercourse must be practiced in a safe way.

Many municipal authorities have urged their communities to take part in cleaning programs so that mosquito breeding grounds can be demolished. Many such steps have been taken by the United States authorities to deter the vectors that can spread not only Zika but other harmful viruses as well. According to many epidemiologists at different universities in America and public health experts, mosquito populations are very likely to increase in the near future. Climate change, international traveling and rapid urbanization all across the world will provide access to these vectors to human populations.

## Climate Change and Disease Spread

As one can clearly notice, the climate is changing every passing day. This change is also bound to introduce the human population to a variety of deadly diseases and viral infections that were not known to humans in the past (UNICEF). The buildup of greenhouse gases in the atmosphere is making the climate hotter and denser. Such a climate is an ideal situation for vectors to carry diseases from one place to another. Scientists have noted that the Aegypti mosquito is adapted to living in an urban environment. They use any container that can carry water as their breeding ground.



In the wake of such revelations, it is crucial for the community to take charge and put its effort into trying to eradicate the menace. Communities all across the world, especially in the Caribbean and Latin American countries, have been urged by the international regime to clean up potential mosquito breeding grounds. It is the necessity of the time since no vaccine has yet been produced, and the mosquito, which causes Zika, is able to cause yellow fever, dengue and chikungunya as well (UNICEF). Many countries have also held vaccination weeks. During these weeks, authorities have shared information about mosquito-borne diseases and how to control them with the general public.

These mosquitos breed in clean waters, which can be found in containers, cans or bottles. Municipal authorities have advised the local populations in the most affected areas to make sure all the containers and tanks that hold water are sealed or covered in order to keep the mosquitos out. Water in such tanks and containers must be changed every other day, and their insides must be brushed at least once a week. All unused containers must be disposed of away so that they cannot serve the function of being a site of mosquito breeding in the future. If such containers cannot be thrown away then they must be sealed so they may not be filled with rainwater (UNICEF). Similarly, the whole environment must be cleaned, and pollution must be eradicated, as this will lead to fewer chances of diseases and viruses. Higher authorities in El Salvador, Haiti, Saint Lucia, Bolivia, Venezuela and more are currently making such efforts.

## Role of Children, Schools, and Media

Moreover, the protection of society against Zika is not only the responsibility of adults. Children and young adolescents must also take part in this campaign and play their roles efficiently. Children can be advocates of Zika prevention so that they can communicate with their friends and fellows about the dangers of the disease and the methods to control it. They can be included in discarding mosquito breeding sites in their schools, playgrounds and other public spaces.

Educational authorities must also include Zika prevention activities in school and college subjects. This issue can also be made part of workshop discussions and class projects, to better create awareness (UNICEF). Media should also play an active role, as it does, in circulating public messages and regulating support from all across society to participate in these campaigns. The inclusion of the whole society, irrespective of age and gender, is very important in battling this problem.

## Sexual Transmission and Partner Responsibilities

Every member of the community has a role to play in countering Zika. The duty falls upon the shoulders of men, women and children. However, the scope of their participation is not only limited to cleansing the environment of potential mosquito breeding sites. The virus is transmitted from one person to another through sexual contact. This is how it has affected numerous pregnant women and, ultimately, affected their babies with cerebral deformities.



Given this situation, it is adamant that partners take special care and precautions with each other, as anyone of them can be vulnerable to the virus. Furthermore, if a male partner begins to show symptoms of illness, then doctors have advised abstaining from any sexual activity for six months. Those people who are planning to conceive a child, especially after their visit to an infected area, must wait a month to allow the presence of any virus to end in their systems (Singh et al., 2018). People who visit infected regions must be on high alert in case they begin to show any sign of infection and seek medical help immediately if they do. The use of contraceptives must be encouraged by parents, societal elders, health experts and higher authorities through proper regulation of media. This, in return, would create awareness among the public on how to prevent not just the Zika virus but other sexually transmitted diseases during sexual activities.

Men here have a very important role to play in protecting their women and babies from the potential risk of Zika. Men have much larger roles in the decision-making process in most patriarchal societies. Oftentimes, these men neglect many factors while engaging in sexual activities with their partners, such as the risk of getting sexually transmitted diseases or the use of contraceptives. This neglectful behavior has been one of the causes of the Zika virus being transmitted sexually between partners.

Many public health experts have voiced their concern about such behavioral patterns. They believe that clinicians should first advise and educate men about safe sexual practices, their role as a partner to a woman suffering from Zika or their role as a father to a child infected with Zika. They must also respect a woman's right to negotiate sex and leave behind all cultural norms and practices in order to protect their family from falling prey to a dangerous virus (Tambo et al., 2017).

Sexual contact has been a primary factor in the Zika virus spread in the American continent. This is how it has also been spread to the United States when one partner or partners visited the infected area outside their country and mated with each other after being infected. Many symptoms of the Zika virus being sexually transmitted are the same as other mosquito-borne diseases. Scientific studies on this issue have concluded that the presence of the Zika virus is longer in the semen than it is in the blood. Thus, the Zika virus can be detected in the semen even if it is no longer detectable in human blood or serum.

Based on these reports, public health experts have issued guidelines that couples do not engage in sexual intercourse if one of the partners has visited or lived in an area affected by the virus. Similarly, precautionary measures must be employed if couples wish to engage with each other sexually, such as the use of condoms and contraceptives (Russell et al., 2016). UNICEF has also listed measures to control the sexual transmission of the virus. Pregnant women must protect themselves from being bitten by mosquitos and use repellents or wear full clothes to do so. Similarly, if any woman is planning a pregnancy, then she must consult public health experts so that her pregnancy can be monitored and made safe from any infection.

Likewise, if any woman suspects that she might be expecting must seek a doctor, and her pregnancy can be confirmed. In most affected areas, it is best to delay pregnancy by the use of contraceptives or

medical procedures. The medical community has also advised this. The same instructions go to men as well. If any man living in the Zika outbreak area wishes to participate in sexual intercourse with his partner, he must use protective measures (UNICEF).

## Responsibilities of Healthcare Workers

Healthcare workers also have a potential role to play in battling this virus. In order to ensure the health and safety of their patients, they must first protect themselves from all the prospects of getting the virus. They must never hide any information about the virus from their patients and guide them thoroughly about the dangers of being infected, and how to prevent the infection. Healthcare experts must make sure that no infected woman abstains from breastfeeding. It is a misunderstood concept that breastfeeding by an infected mother can also transmit the virus to the baby through her milk. Breastfeeding is very important for all infants and babies, as it can help in the growth and development process of the child and protect him from further diseases (UNICEF).

## Government and International Response

In the end, the utmost responsibility to control the pandemic falls upon the national governments and the international community. National governments, especially of infected countries, must deploy all their resources to control and manage vector populations. Local communities and authorities must aid governmental programs in managing Zika control measures. All segments of the society must be included in these efforts and awareness must be created from grassroots levels. Media must be authorized to regulate messages for the prevention of Zika and must empower the public to fight against the virus. The international health community must also assist and fund such governments and organizations in their efforts.

## Conclusion

The recent outbreak of the Zika virus and its spread across the globe displayed a problem for the international community. It showed that terrorism, political instability, civil wars, the spread of nuclear weapons and climate change are not the only problems the world is facing. Disease and their ability to spread across the globe have the equal potential to devastate humanity. Globalization is rapid in the contemporary world and it is very easy for individuals to carry diseases from one place to another. This is also how the Zika virus has been spread from one continent to another continent. It is an infectious disease that is transmitted through bodily fluids, such as semen and blood. The easiest way for its transmission is unprotected sexual activity. This is how it has infected many people and still continues to do so. This virus has rendered the healthy future of children unpredictable as it affects the nervous systems of unborn babies. Given its severity, which has been discussed, it is time for the international community to take joint action and protect an unborn generation from lifetime mental

deformities.