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Future perspectives: investigating the relationship between Zika virus and congenital anomalies in newborns

Future perspectives: investigating the relationship between zika virus and congenital anomalies in newborns

Priscilla Barbosa Onofre
priscilaenison@gmail.com
Medical student at the Northern Educational Union – UNINORTE

Douglas José Angel
douglas.angel@uninorteac.com.br
Professor/Advisor at the Northern Educational Union – UNINORTE

SUMMARY

A global concern due to its association with congenital anomalies, such as microcephaly, in affected pregnancies. The rapid spread of the Zika virus has led to a coordinated global response to address this public health emergency, highlighting the importance of understanding the effects of the Zika virus on pregnancies to guide public health policies and effective clinical practices. Objective: to investigate the relationship between the Zika virus and its consequences on pregnant women and developing fetuses, seeking to understand the impacts of infection by the virus during pregnancy. Method: This current study constitutes an exploratory and qualitative literature review carried out from January to April 2024. Secondary research sources available in accessible databases for full reading were used. The research was conducted through the analysis of books, articles and protocols available on electronic platforms such as Google Scholar, Scielo and PubMed, covering the period from 2019 to 2024. Results: The study explains the severity of the impacts of the Zika virus on pregnancies, highlighting the relationship between the infection of pregnant women with the virus and the appearance of congenital anomalies in newborns. Conclusion: an in-depth understanding of the risks associated with Zika virus infection during pregnancy is crucial to guide public health policies and effective clinical practices, aiming to protect the health and well-being of pregnant women and their babies, to mitigate the adverse impacts of the Zika virus on future generations.

Keywords: Zika Virus, congenital anomalies and pregnant women.

ABSTRACT

A global concern is due to its association with congenital anomalies, such as microcephaly, in affected pregnancies. The Zika Virus has rapidly spread, leading to a coordinated global response to address this public health emergency, highlighting the importance of understanding the effects of the Zika virus on pregnancies to guide effective public health policies and clinical practices. Objective: To investigate the relationship between the Zika virus and its consequences on pregnant women and developing fetuses, aiming to understand the impacts of virus infection during pregnancy. Method: This current study constitutes an exploratory and qualitative literature review conducted in March 2024.

Secondary research sources available in accessible databases for full reading were used.
The research was conducted through the analysis of books, articles, and protocols available on electronic platforms such as Google Scholar, Scielo, and PubMed, covering the period from 2019 to 2024. Results:
The study elucidates the severity of the impacts of the Zika virus on pregnancies, highlighting the relationship between maternal infection with the virus and the appearance of congenital anomalies in newborns.
Conclusion: A

Comprehensive understanding of the risks associated with Zika virus infection during pregnancy is crucial to guide effective public health policies and clinical practices, aiming to protect the health and well-being of pregnant women and their babies, to mitigate the adverse impacts of the Zika virus on future generations.

Keywords: Zika Virus, congenital anomalies, pregnant women.

1. INTRODUCTION

Identified a few years ago and classified as a type of flavivirus, the Zika Virus (ZIKV) is part of the flaviviridae family and is transmitted by mosquitoes. This virus contains a single-stranded, positive-stranded RNA that carries information to make a protein precursor, subject to processing by both viral and viral proteolytic enzymes cellular, resulting in three distinct structural proteins: the capsid, the precursor of membrane and envelope proteins, along with seven nonstructural proteins, identified as NS1 to NS5. Their discovery occurred during scientific studies on the life cycle of yellow fever viruses and other unknown arboviruses in the forest Uganda Zika. The first recorded evidence of a person infected with ZIKV dates back to 1952 in Uganda, followed by the subsequent isolation of the virus in humans humans in Southeast Asia (FERRARIS, P, 2019).

ZIKV was first identified in East Africa in the 1950s and has remained endemic in Africa and Southeast Asia. In 2007, it attracted attention internationally due to an outbreak in Micronesia and subsequently cases were reported on the island of Yap in French Polynesia over the next decade. After that, the virus spread across several Pacific islands and emerged as a widespread epidemic in Latin America. ZIKV entered Brazilian territory in 2015, through previously infected individuals who had traveled to other countries, being vectors transmission to the Aedes aegypti mosquito or through sexual activity with infected travelers (TEIXEIRA, G., 2020).

With the introduction of ZIKV into Brazilian territory, studies have identified that pregnant women who have had a disease characterized by skin rashes during pregnancy pregnancies were giving birth to babies with microcephaly. Because of these discoveries and the analysis of patterns, in 2015, congenital transmission of the infection became recognized. In these studies, microcephaly was described as a head size smaller than two standard deviations below the expected mean for sex, gestational age, or gestational age specific, as defined by the guidelines of the Brazilian Ministry of Health (TEIXEIRA, G., 2020)

The attention of the scientific community was directed to Brazil due to significant clinical findings, including cases of microcephaly and other malformations fetal, especially observed during the prenatal period. These findings led to the identification of what is now known in the literature as congenital Zika syndrome (SCZ). The emergence of this new syndrome reflects the complexities faced by Brazil in dealing with the need to find effective responses to control the Aedes aegypti mosquito. This mosquito acts as a vector in the transmission of several diseases, including Zika, whose consequences are especially serious for women pregnant women and their babies, resulting in SCZ (FREITAS, P., 2019).

The increasing incidence of Zika virus in pregnant women has raised concerns both at the World Health Organization (WHO) and at the Ministry of Health. This is owes to several studies that demonstrated a significant relationship between changes neurological, fetal and embryonic deaths in pregnant women with positive serology for virus or detection of viral RNA in blood and urine. The fetuses of these pregnant women were diagnosed with microcephaly and other anomalies in the central nervous system, identified by means of ultrasound (SOUZA, L., 2020).

This study addresses an extremely important topic by investigating the relationship between the Zika virus and its consequences for pregnant women and developing fetuses. Understanding the impacts of Zika virus infection during pregnancy is essential not only not only for the individual health of pregnant women, but also for public health in general. The rapid spread of the Zika virus and its association with congenital anomalies such as microcephaly, have generated significant concerns worldwide, leading to a coordinated global response to address this public health emergency.

2. RESEARCH METHOD

This current study constitutes an exploratory and qualitative literature review carried out from January to April 2024. Research sources were used secondary available in accessible databases for complete reading. The research was conducted through the analysis of books, articles and protocols available in electronic platforms such as Google Scholar, Scielo and PubMed, covering the period from 2019 to 2024.

During the research phase, three criteria were used to select the materials: relevance of titles and abstracts for the topic under analysis, availability of

full texts of articles and compliance with the specified time range. The top search terms included "Zika Virus", "congenital anomalies" and "pregnant women". Based on this search, the articles were chosen for the preparation of this current study.

RESULTS AND DISCUSSION

2.1. Spread of the infectious agent and scientific findings

In May 2015, the Ministry of Health stated that in the territory Brazilian had experienced the first infection by ZIKV, identified in the northeast region of the country. The virus spread to other parts of the country and, during the second half of the year this year, there was a significant increase in reports of microcephaly cases in newborns registered in the Live Birth Information System (SINASC) in states such as Paraíba, Pernambuco and Ceará, in addition to occurrences of spontaneous abortions and stillbirths. These events have raised serious public health concerns (LAUREL, N. 2019).

With the rapid spread of ZIKV and the observed anomalies, the WHO issued an emergency alert for the whole world in 2016 due to the correlation between the infection in pregnant women and the development of microcephaly in fetuses. Brazil was the pioneer in conduct studies and research that defined a connection between ZIKV infection during pregnancy and the occurrence of microcephaly in newborns (LOURO, N. 2019).

Zika virus infection during pregnancy presents several risks for women. pregnant women and for the healthy development of the fetus. One of the main risks is the increased likelihood of neurological complications and malformations congenital defects in the fetus, such as microcephaly and other brain anomalies. These complications can lead to serious health and developmental problems for the child after birth.

Initial detection of abnormalities associated with intrauterine infection by the virus Zika occurred with the identification of microcephaly in newborns. Later, they were other congenital malformations were recognized, leading to the emergence of the syndrome congenital Zika virus (CZV). Between 2015 and 2016, almost 10,000 cases suspected cases of SCZ have been reported in Brazil, with 2,018 of these cases being confirmed. The concentration of these cases was especially significant in the Northeast Region of Brazil, with Bahia presenting the second highest number of reported cases among

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northeastern states. The municipality of Salvador had high case rates
confirmed cases of SCZ, with 105 cases confirmed in 2015 and 130 cases in 2016.
increasing number of births of children with congenital syndrome
Zika virus was so significant that it led the Ministry of Health and then the WHO to
make a statement classifying the spread of ZIKV as an epidemic,
and defining it as a public health emergency. (LIMA, F, 2021)

2.2. Consequences of infection for fetal development

Within the scope of the consequences of SCZ, it is noted that brain changes occur mainly in the second and third trimesters of pregnancy. In addition, other types of deformities are frequently observed in newborns of mothers infected with viruses, such as marked prominence of the occipital bone, premature closure of the fontanelles at birth, excess skin or folds on the scalp, and umbilical hernia. (GARBIN, C., 2021)

The fetal repercussions of intrauterine ZIKV infection are more severe when they occur during the first and second trimesters of pregnancy, and may range from fetal death to the development of various congenital anomalies. These include redundant skin on the back of the neck with prominence of the occipital bone, low weight at birth, anasarca (generalized swelling), arthrogryposis (joint contractions), loss hearing loss, polyhydramnios (excess amniotic fluid) and eye and brain malformations central nervous system (CNS). The most common fetal anomalies seen by ultrasound (US) and magnetic resonance imaging (MRI) include microcephaly (head small), ventriculomegaly (enlargement of the cerebral ventricles) and calcifications multifocal. In some cases, changes are also observed in the posterior fossa, such as cerebellar hypoplasia (reduced development of the cerebellum) and elongated pons (WERNER, H,2019).

The health effects on pregnant women and fetuses may vary depending on the timing of infection during pregnancy, viral load and other individual factors. However, it is widely recognized that Zika virus infection during pregnancy represents a serious risk to maternal and fetal health, requiring preventive measures, appropriate diagnosis and intervention to minimize damage.

Based on the evidence discovered about the development of the disease and its pathogenesis, we can firmly state that there is a causal relationship between infection by

Zika during pregnancy and the significant increase in the incidence of miscarriages, stillbirths and early mortality, as well as the development of microcephaly in newborns (GARBIN, C., 2021).

In the long term, the effects of Zika virus infection during pregnancy can persist throughout the lives of affected children, requiring ongoing interventions and support to cope with the physical, cognitive and emotional consequences. This may include rehabilitation therapies, specialist medical care and psychosocial support to help children and their families to deal with the challenges resulting from anomalies congenital.

ZIKV's main focus of attack is neural progenitor cells, which explains the diversity of changes observed in the fetal CNS in examinations neuroimaging. Today, it is understood that damage to the central nervous system is comprehensive, and microcephaly is just the most visible symptom of a devastating process caused by this infection in the fetal brain. Even though neuroimaging findings in SCZ are not unique to the disease, many of them are highly suggestive, requiring the radiologist be prepared to perceive, interpret them and suggest the diagnosis appropriate (WERNER, H,2019).

ZIKV infection can cause a reduction in the length of the femur and humerus during fetal development. Several studies conducted in several countries have documented these changes in pregnancies affected by Zika (Oliveira et al., 2020).

Infection from ZIKV during pregnancy can have an impact on development of the formation and function of the placenta, leading to various abnormalities placental. The placenta is essential for fetal development as it provides essential nutrients and oxygen, while filtering out harmful substances and produces important hormones to sustain pregnancy (Musso & Baud 2019).

Studies on the subject indicate that intrauterine growth retardation is one of the most frequent manifestations of Zika infection during pregnancy. A systematic review of studies carried out in several countries, published in 2019, concluded that the prevalence of intrauterine growth retardation in pregnancies with Zika infection ranged from 3% to 42%, depending on the case definition adopted in each study (Brasil et al., 2019)

Furthermore, Zika virus infection during pregnancy affects not only the central nervous system, but also fetal growth in general. Studies indicate that infection can lead to changes in growth. Another issue of concern concerns

to the changes that occur in the placenta, which has an essential function in providing nutrients and oxygen to the fetus. Placental abnormalities resulting from infection can compromise this vital function, further increasing the risk of complications for the fetus.

Although microcephaly is one of the most visible results, it is only one manifestation of the devastating process that infection can cause in the fetal CNS. damages are multiple and can manifest themselves in many ways, many of which can be suggested by neuroimaging exams.

3. CONCLUSION

The rapid emergence and spread of the virus, combined with the anomalies observed in exposed fetuses, prompted an urgent global response by the World Health Organization Health (WHO) and local health authorities.

Brazil was the initial epicenter of this emergency, with a concentration significant number of cases of microcephaly and other congenital malformations observed mainly in the Northeast region. The impact of these anomalies on maternal and fetal health and childhood is profound, requiring preventive measures, early diagnosis and intervention therapy.

The causal relationship between Zika virus infection during pregnancy and increased of the rates of miscarriages, stillbirths and early infant mortality is clear, highlighting the urgent need for integrated approaches to deal with this crisis. Furthermore, long-term complications faced by affected children require interventions ongoing, including rehabilitation therapies and psychosocial support.

Infection during pregnancy poses a serious threat to development healthy fetal development. Neural progenitor cells are identified as a primary target of the Zika virus, resulting in a series of changes in the central nervous system. The microcephaly, although it is the most obvious manifestation, is considered only the tip of the iceberg iceberg, reflecting the devastating impact this infection can have on the brain in fetal development.

Furthermore, studies indicate that Zika virus infection during pregnancy can affect the formation and function of the placenta, compromising the health and development of the fetus. Placental abnormalities may result in restriction of the intrauterine growth, reduction in limb length and other changes in

development, further increasing the spectrum of complications associated with Zika virus infection.

In short, a deeper understanding of the risks associated with Zika infection virus during pregnancy is crucial to guide public health policies and practices effective clinics, aiming to protect the health and well-being of pregnant women and their babies, to mitigate the adverse impacts of the Zika virus on future generations.

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