

## Actions developed at the Instituto de Medicina Integral Prof. Fernando Figueira to confront microcephaly by Zika virus

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### Abstract

*Objectives: to publicize by inserting institutionally to the context of microcephaly care by Zika virus in the Northeast of Brazil and to describe the activities developed during the epidemic outbreak that occurred in the country in 2015.*

*Methods: analysis on technical documents and institutional announcements in newspapers, on television and radio was carried out from August 2015 to July 2016.*

*Results: the Central Nucleus to Monitor and Study Microcephaly at Instituto de Medicina Integral Prof. Fernando Figueira (IMIP); took part in elaborating a Clinical and Epidemiological protocol for Professionals at Maternity Hospitals and Referral Services from the State Health Department of Pernambuco (SES/PE); IMIP became a National Referral Center in elaborating protocols to identify and monitor children with microcephaly, and a Benchmark Assistance for the State Health Department of Pernambuco. Technical meetings took place with the participation of clinical and medical professionals, researchers, professors and institutional managers, forums, training sessions and workshops along with national and international institutions, technical visits of international organizations and development of studies on Zika virus and microcephaly.*

*Conclusions: the impact by notifying microcephaly cases caused mobilization of services at IMIP, reorganization of work processes and research developments.*

**Key words** Arboviruses, Zika virus, Microcephaly, Technical report

## Introduction

The Ministry of Health of Brazil confirmed recently, the relation between the cases of microcephaly that is occurring since 2015 in the country and Zika virus which is transmitted by the mosquito, *Aedes aegypti*. However, some questions are still unclear and have been the subject of several ongoing studies about the transmission of the mechanism and its role as an agent in the human organism, and so on. The rising number of microcephaly cases in Pernambuco State that year, contributed the MH to inform in January of this year, 4783 cases of microcephaly and/or malformation in the central nervous system (CNS), including 76 deaths, comparing the mean of 160 cases per year between 2001 and 2014. This caused the MH to determine as a mandatory notification of microcephaly cases and to register women who are suspected to be infected by the virus during pregnancy.<sup>1</sup> Brazil and the French Polynesian reported an increase of microcephaly cases and other possible malformation associated by Zika virus, even though, currently 47 countries have registered its autochthonous transmission.<sup>2</sup>

In Brazil, until July 9<sup>th</sup>, 2016, 8451 were suspected cases, according to the MH Surveillance Protocol definition (newborn, stillbirth, miscarriage or fetus). Of those 8451, 1687 cases were confirmed for microcephaly and/or alteration in the CNS suggestive for congenital infection, and 3142 cases remain under investigation.<sup>3</sup> Pernambuco was the first state to identify the increased number of microcephaly in the country and continues having the highest number of suspected cases, followed by Bahia. On August 1<sup>st</sup> 2015 to July 9<sup>th</sup>, 2016 were notified 2048 cases through the Center of Strategic Information on Health Surveillance in Pernambuco (CIEVS-PE), confirming 369 cases with 507 under investigation. In Bahia State these numbers represent 1187; 268 and 665 respectively.<sup>3</sup> In Pernambuco, therefore, a considerable increase in the number of cases was observed comparing to 2011 to 2015 which presented an annual average of 09 cases. About 10% of the total number of cases reported in the State, the births occurred at Instituto de Medicina Integral Prof. Fernando Figueira (IMIP).<sup>4</sup>

As a result of failure of the development of the brain caused by genetic or environmental factors, microcephaly is usually identified soon after birth, being determinant of problems in the child's development. Such as some syndromes of *Down*, *Edwards*, *Smith-Lemli-Opitz* and *Cri du chat* are examples of genetic diseases that are the cause of this condition. The environmental factors are among

the infectious agents such as Rubella, Toxoplasmosis and Cytomegalovirus, severe malnutrition during pregnancy, decrease of oxygen due to complications during pregnancy or at childbirth, maternal phenylketonuria and exposure to alcohol, drugs and other chemical agents during pregnancy. The alteration in the neuro-psycho-motor attributing to Zika virus are different from those found in microcephaly by other causes and the sensory-motor sequels and cognitive-behavioral may vary from mild to severe, and also it is still important to consider social effects on children and their families.<sup>5</sup> An early care is a priority to promote stimulation at short term to prevent the arising physical and intellectual impact.<sup>1</sup>

IMIP is involved in the areas of healthcare, teaching, researching and community extension, it is a reference center in several medical and non-medical specialties. It conducts training sessions for national and international healthcare professionals and gives assistance and consulting management to the Unified Health System (SUS). Accounting for 1066 hospital beds exclusively for SUS patients and performs more than 600,000 visits a year in its services, assisting patients of medium and high complexity, coming from all regions of Pernambuco State and other States in the North and Northeast of the country, where it is a reference to children, women and adults' health. Among the services performed, there are various specialties in pediatrics and healthcare for adults, including outpatient and emergency services, intensive care, neonatology, Mother Kangaroo Method, clinical analysis laboratory and diagnostic imaging service, in addition to Physical Medicine and Rehabilitation service is a reference to people with disabilities. Also highlighting that the medical specialties (neurology, orthopedics, ophthalmology, otorhinolaryngology and among others) at the ambulatory attends and performs diagnosis for people with disabilities.<sup>6</sup>

Given this scenario, this article has the objective to publicize by inserting institutionally in the context to draw attention to microcephaly by Zika virus in Northeast of Brazil and to describe the activities developed during the epidemic outbreak occurred in the country in 2015. Analysis on technical documents and institutional announcements in newspapers, on television and radio was carried out from August 2015 to July 2016.

### **Assistance to children with microcephaly by Zika virus at IMIP**

IMIP has excelled in its 56 years of existence in pioneering services provided to the population,

having national and international organs, governmental and non-governmental organizations as partners, to face many challenges in health. Until August 2015, there were approximately a dozen cases of microcephaly per year at this institution. Between the months of August and October in the same year, 34 children with microcephaly were born in the maternity ward at the IMIP.<sup>6</sup> Based on this information, the State Health Authorities determined that from October 27<sup>th</sup>, 2015 that this tort would be mandatory notification. On this occasion, the State Health Department of Pernambuco established the Committee in Health Emergencies (COES) that IMIP should be and take part of this action.<sup>7</sup> The institution contributed also with SES/PE in the elaboration of the clinical protocol and epidemiological guidance for the professionals at the maternities and the referral units.<sup>7,8</sup> In order to respond this challenge effectively, the Central Nucleus to Monitor and Study Microcephaly at Imip was established.

Due to the scene of urgency, the significant increase of microcephaly cases possibly associated to Zika virus in Pernambuco State and the relevant healthcare performance in the region, IMIP became a national reference center for the development of protocols to identify and monitor children with microcephaly along with the Ministry of Health<sup>8,9</sup> and a referral healthcare assistance for the State Health Department of Pernambuco.<sup>10</sup> So then, a professional team was formed by pediatricians, neonatologists and obstetricians, neuro-pediatricians, ophthalmologists, pediatric cardiologists, professionals of diagnostic imaging, physical therapists, speech therapists and psychologists to attend and follow the cases.<sup>11</sup>

In order to accompany the population of pregnant women with risk of vertical transmission of Zika virus, the institution structured services starting in October 2015.<sup>12</sup> The follow-up on pregnant women began to be carried out at different moments of time. For those who presented skin rash at any quarter of their pregnancy has to make a notification of the case, and exams were collected to diagnose arbovirus (Zika, Chikungunya and Dengue Fever) and other infections such as cytomegalovirus, rubella and toxoplasmosis. In cases of high-risk pregnancy, the pregnant women are advised to continue the pre-natal care at the basic health units performing obstetric ultrasound between the 32<sup>nd</sup> and 35<sup>th</sup> weeks of gestation, the ideal moment for the confirmation of microcephaly. For pregnant women diagnosed positive for microcephaly coming from another service or the ambulatory itself, the notification and the regular prenatal monitoring are

performed at the service where they initiated or at IMIP with psychological attendance and childbirth delivery at any Unified Health System referral maternities or at the institution according to the State Health Department of Pernambuco protocol.<sup>13</sup>

The cases considered suspicious of microcephaly, based on the head circumference, according to the parameters of WHO, should be followed since the delivery room where the blood of the newborn's umbilical cord is collected from for exams that are set in the State Health Department of Pernambuco protocols.<sup>10,13,14</sup> Clinical and initial neurological evaluation, CT scan of the brain without contrast are performed and the mother's blood is collected (serology) and subsequently they are forwarded to the ambulatory to accompany children with microcephaly. This ambulatory was built since October 2015, with an exclusive pediatrician for these consultations three days per week. Since then, 150 children are followed monthly at the microcephaly ambulatory. The followed-up children's families are directed to the Social Service at IMIP, where they are forwarded to different services and governmental programs including some financial benefits.<sup>6</sup>

IMIP is a referral center in rehabilitation and physical medicine since October, 2010.<sup>15</sup> Children diagnosed with microcephaly are forwarded to the Center of Rehabilitation and Physical Medicine Prof. Ruy Neves Baptist where they are evaluated and inserted in the program for early stimulation with an interdisciplinary team formed by professionals from the fields of physical therapy, occupational therapy, speech therapy and psychology. This program is intended for children up to 12 months and consists of activities of guidance for the responsible and/or caregivers about how to stimulate the baby at their home environment, as well as transporting on the lap and positioning correctly, encouraging the stages of motor development and promote an appropriate developments on functional skills. The attendance are individualized and performed at a gym therapy room to accommodate the children and their families to conquer the greatest functional gain during the first years of life.<sup>15</sup>

The institutional epidemiological data in July, 2016 reported 297 cases, 203 infants were born at IMIP and 94 were from other health units. Eleven children with microcephaly, born at IMIP, died. The cases notified at the institution, 50% are from Recife and the Metropolitan Area (RMR), and the other 50% are from other cities in the State. The children followed at the microcephaly ambulatory clinic, 127 cases were confirmed by tomography exams and clinical reassessment.<sup>16</sup>

### **Relevant institutional events in the context of microcephaly in Brazil**

IMIP Forum on microcephaly care was held in December, 2015, which the State Health Department of Pernambuco presented the panorama of microcephaly in the State and discussed the Protocols for Pregnant Women and their Newborn Infants with microcephaly. Still at the same month, IMIP signed an Understanding Memorandum for institutional cooperation among Oswaldo Cruz Foundation (Fiocruz), the State Health Department of Pernambuco, Municipal Health Department of Recife, Universidade de Pernambuco and Universidade Federal de Pernambuco. The document aimed to define the inter-institutional cooperation bases to develop researches and teaching activities towards the implementation of projects and studies on the Epidemic Microcephaly.<sup>17</sup>

In January 2016, an Attendance care for Pregnant Women with Rashes at IMIP was implemented and the fetal medicine section was adapted to perform ultrasounds on pregnant women with suspected fetuses presenting microcephaly. In a Pediatric general meeting for staffs, medical residents and students, a protocol on newborns with microcephaly and ambulatory follow-up were presented and discussed.<sup>18</sup>

In February 2016, the director of Strategy in Programmed Action Department of the Healthcare Secretary of Ministry of Health visited the institution with a goal to evaluate the increasing numbers of microcephaly cases in Pernambuco State and to analyze how IMIP was facing the challenges to ensure the assistance for the children and pregnant women.<sup>17</sup> In that same month, with the presence of the British Medical Journal (BMJ) representatives, they established partnership between their group and IMIP. On that occasion, the president and the general superintendent of IMIP, together with the chief of Human Resources in Health of the Pan-American Health Organization (PAHO), the managers and the professionals involved with the care of pregnant women and their children with microcephaly, defined along with the director and the British Medical Journal (BMJ) representative in Brazil, the participation of researchers at IMIP as reviewers for a monthly publication of this journal on Zika virus.<sup>18</sup>

Still in the month of February, the general director of WHO and the general director of the Pan-American Health Organization visited IMIP to know about the developed actions in the institution related to the care for children with microcephaly. Other health authorities participated in the visit to the

Rehabilitation Center and the Pediatric ambulatory clinic, the Minister of Health, the State Secretary of Health in Pernambuco and the Municipal Secretary of health in Recife accompanied by the President of IMIP and by the general Superintendent, as well as the managers who are directly involved with the cases of microcephaly in the institution.<sup>18</sup> During the meeting, a Cooperation term was signed between the Minister of Health and IMIP to train health professionals in actions related to the occurrence of microcephaly and other ailments related to the infection by Zika virus.<sup>19</sup>

In the following month of March, 2016, managers and technicians at IMIP attended the A, B, C, D, E and Zika virus Workshop, promoted by Fiocruz Pernambuco. The event was attended by Brazilian and foreign researchers, who have provided information about the epidemiological, clinical and diagnostic Zika virus and among other arboviruses.<sup>20</sup> This month, at IMIP was held the first videoconferencing about breastfeeding and microcephaly, being part of a series of meetings that occurred for the Human Milk Banks in Brazil. The Human Milk Bank at IMIP (HMB/CIAMA) was defined as the first Referral Center to initiate the cycle of activities. The videoconference was attended by the representatives of the State Health Department of Pernambuco, as well as the managers and technicians at IMIP.<sup>20</sup>

In April 2016, an infectologist physician and researcher at IMIP was invited by the International Atomic Energy Agency (AIEA), linked to the United Nations Organization (ONU), to attend lectures, workshops and training sessions on the diagnosis of Zika virus in Seibersdorf, Austria. During the training sessions, health professionals from Latin America, the Caribbean, Africa and Asia were qualified.<sup>20</sup> In that same month, the Coordinator of the Women's Care Center (CAM/IMIP) represented the institution in a Congress about Zika virus and microcephaly, promoted by PAHO, in Panama. The meeting enabled the exchange of experiences among institutions of the countries that integrate the Americas in dealing with a disease caused by Zika virus, on an occasion was presented a formation of network support for mothers of babies with microcephaly.<sup>20</sup> Still this month, representatives of the Special Commission on Microcephaly Cases Follow-ups of the Legislative Assembly of Pernambuco, visited the premises at the institution to know about the procedures adopted by IMIP in attending cases of microcephaly. The Commission mentioned was created in December, 2015 with the objective to monitor cases of microcephaly in the

State.<sup>20</sup>

In the month of May, 2016, IMIP received a visit from the commission representatives of WHO and PAHO. The president of the institution hosted the commission who were composed by the director of strategy at WHO, the director of PAHO/Brazil, the coordinator of the Technical Unit of Transmitted Diseases and Analysis of Health Situation of PAHO/Brazil, the manager in the area of surveillance, control and disease prevention of PAHO and the International Assessor of the Ministry of Health. Accompanied by the medical director, the coordinator of the Center Nucleus to Monitor and Study Microcephaly and along with the coordinator of Pediatrics at IMIP and the coordinator of Women's Care Center -IMIP, visited the pediatric ambulatory clinic, and afterwards the Motor Rehabilitation Center, which allowed to observe the actions on care assistance focused on children with microcephaly.<sup>20</sup>

Undergraduate, post-graduate students and professionals at IMIP have constantly been encouraged to develop studies about microcephaly and Zika virus. In this direction, various research projects were submitted to be selected for publications by national and international agencies in research support. In May of this year, terms of concession were signed on two projects selected by the Edital 04/2016 of the Support Foundation in Science and Technology of the State of Pernambuco (Facepe): the role of environmental cofactors in the epidemic Zika-Microcephaly, and Microcephaly, nutrition and infection: the revisited problem.<sup>21</sup> In addition to the studies mentioned, there are six studies on the microcephaly in progress at IMIP, one of them is in co-participation with Oswaldo Cruz Foundation. IMIP integrates the Scientific Initiation

Program from Conselho Nacional de Desenvolvimento Científico e Tecnológico (PIBIC CNPq/IMIP). For the period of 2016/2017, some students were selected to conduct three studies on the theme of microcephaly, oriented by professors-physicians at the institution.<sup>21</sup>

In the months of January and June, 2016, the growing number of cases of microcephaly and its repercussions for society and for the academic environment brought the press to look for the institution, generating several materials on the subject. In this period, 30 vehicles of the international press were at IMIP, among them were: The Wall Street Journal, Agência Reuters, BBC London, Al Jazeera, La Nación, The Independent, The New York Times, Washington Post, CNN, Stuttgarter Zeitung, Frankfurter Rundschau and Berliner Zeitung.<sup>21</sup> As well as, the largest press media agencies, the television and national radio and Rede Globo, the Brazilian System of Television (SBT), Rede Record, Rede Bandeirantes (BAND), Folha de São Paulo, Estado de São Paulo, Correio Brasiliense, Estado de Minas, Central Brasileira de Notícias (CBN), in addition to the State press reported the information about the occurrence of cases accompanied at IMIP.<sup>21-23</sup>

The strong impact, in terms of public health caused by the notification of microcephaly cases led to mobilization of multi-professionals services at IMIP being responsible to assist and monitor groups affected by the disease. The managers are promoting a reorganization of work processes, in qualifying the assistance procedures and researchers who seek answers through studies, like some published in this issue of the Brazilian Journal of Mother and Child Health.

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