

Nursing Care Actions to Prevent and Control the Zika Virus: A Review

Chella Maria Lins Bentes¹, Marcos do Nascimento Bentes², Kátia Cilene Godinho Bertoncello³, Selma Regina de Andrade³, Vera Lúcia de Azevedo Lima⁴ and Maria de Lourdes de Souza⁵

¹University of State of Amazonas (DINTER UFSC/UEA), Brazil

²HEMOAM Foundation, Manaus, Amazonas, Brazil

³Department of Nursing, Federal University of Santa Catarina (UFSC), Brazil

⁴College of Nursing, Federal University of Pará (UFPA), Belém, Brazil

⁵Federal University of Santa Catarina, REPENSUL Institute, Florianópolis, Santa Catarina, Brazil

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***For Correspondence:**

Maria de Lourdes de Souza, Federal University of Santa Catarina, Institute REPENSUL, Health Sciences Center, Delfino Conti Street, s/n-Trindade, Florianópolis Santa Catarina, Brazil, 88040-370,

Tel: +55(48)991618333

E-mail: repensul@uol.com.br

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ABSTRACT

Introduction: The infection caused by Zika virus has had worldwide repercussion, as it has been associated with congenital syndromes in children, especially microcephaly, with an impact on public health.

Objective: To identify in the literature care actions provided by nurses to families and pregnant women to prevent and control the infection.

Method: Review study with data collected from seven databases using descriptors and Boolean operators to identify papers.

Results: The titles, abstracts and key words of 2,628 papers were read and the full texts of 39 were selected. Two papers were excluded after reading the full texts because they did not address the objective proposed here, in that they exclusively addressed the care provided to children. Another 29 papers under the original protocols and protocol update modalities were excluded. Thus, a total of eight papers remained and composed the corpus of this review.

Conclusion: The papers do not report specific actions of nurses, but emphasize pregnancy planning; development of knowledge concerning the disease and vaccine; the delivery of health care and social support to the families with children presenting permanent special needs accruing from the Zika virus disease; and the report of suspected and confirmed cases.

INTRODUCTION

Isolated over 70 years ago in Uganda in the Zika Forest, on the Entebbe Peninsula in 1947 by scientists who studied the yellow fever virus in Rhesus monkeys? The Zika virus (ZIKV) is an arbovirus of the Flavivirus genus of the Flaviviridae family^[1]. In 2015, the Brazilian authorities attributed a 20-fold increase in the number of new borns with microcephaly to the ZIKV virus^[2].

Brazil is a country with hot and humid weather. It states present poor environmental structure, among which are inappropriate water supplies and open sewers that work as breeding grounds for mosquitos, which favors the spread of the disease, the vector of which is *Aedes aegypti* mosquito^[3,4].

In October 2015, the State Health Department of Pernambuco (SES/PE) reported the occurrence of 26 cases of newborns with microcephaly in different health facilities in different regions of the state. With the emergence of an increase in the number of new cases of congenital anomalies in children of mothers infected with the ZIKV in Brazil, a Public Health Emergency of National Concern (ESPIN) was declared^[5,6].

The outbreak of the disease in Brazil triggered a mobilization in the technical-scientific community, society and world media. The highest incidence was observed for neurological syndromes, particularly microcephaly. Various studies and much research have been dedicated to devising vaccines, drugs, insecticides and other devices to contain and prevent the spread of infection and associated diseases. Protocols, reports, manuals, guidelines were published to disseminate knowledge among health workers and the broader society, which resulted in the establishment of partnerships among various social entities such as Centers for Disease Control and Prevention (CDC-USA), Ministry of Health of Brazil, Puerto Rico Department of Health, World Health Organization, Pan American Health Organization in order to protect the health of the population^[7-13].

Nursing is a science, the essence and specificity of which is human care, that is, integral care centered on the individual, family and community. Nurses perform their practice based on scientific knowledge seeking to keep such knowledge updated in order to provide quality care^[14].

Since 2015, the epidemic of the Zika virus in Brazil has impacted the puerperal pregnancy process, notably in terms of congenital abnormalities in children, whose mothers were infected with ZIKV during pregnancy. After the diagnostic of microcephaly was informed by the health professional the partner abandonment the family. The mothers alone needed dispense integral care that brought intense changes with economic repercussions. In general, the mother showed worry with development of children, fear of falling ill/die, and be unable to care for the child^[15-17]. Amazonas, the Brazilian state with the largest territorial area, with rich biodiversity that is recognized worldwide, did not escape the repercussions caused by this virus and the stigma of the microcephaly. Taking into account the contribution of nurses to human health and development in this region, a commitment was made to conduct research addressing this topic. Considering the diversity of studies this theme requires, the following research question was established: What care actions performed by nurses for families and pregnant women to prevent and control the Zika virus disease are reported in the literature.

LITERATURE REVIEW

This is an integrative review that provides synthesis of knowledge and applicability of results of significant studies to practice^[18-22].

This review following all step's:

Identfication of the Theme

Zika virus and nursing care;

Research Question

What care actions performed by nurses for families and pregnant women to prevent and control the Zika virus disease are reported in the literature?

Inclusion Criteria

Exploratory, descriptive, analytical, complete scientific papers, among which original studies, reviews, experience reports, theoretical essays, and reflections addressing nursing care provided to and/or nursing interventions implemented with families having pregnant women who were infected with Zika Virus, the full-text of which were available online;

Exclusion Criteria

Publications classified as chronicles, theses, dissertations, letters, book reviews, editorials, book chapters, governmental documents, newsletters, duplicated studies, incomplete papers, and those not available online;

Search Strategies and Sources

The descriptors and key words used in the search were confirmed in the Health Sciences Development (DeCS), Virtual Health Library (VHL), **Table 1**, available at: <http://decs.bvs.br>, retrieved on May 8th, 2018 at 2pm. The descriptors were combined using Boolean operators: AND, OR or AND NOT, as operators aid inclusion criteria and are essential to the search for publications^[23].

Table 1. Descriptors and key words. Manaus, Amazonas, Brazil 2019.

Descriptors and Key words		
Portuguese	English	Spanish
Zika Virus	Zika Virus	Zika Virus
Cuidados do Enfermeiro	Nursing actions	Cuidado del Enfermero
Mulher Grávida	Pregnant woman	Mujer Embarazada
Infeccao	Infection	Infección
Familia	Family	Familia
Gravidez	Pregnancy	Embarazo
Assistência de Enfermagem	Nurse care	Asistencia de enfermeria

The following databases **Table 2** were consulted: Latin American and Caribbean Center on Health Sciences - Regional Library of Medicine (BIREME), Cumulative Index to Nursing and Allied Health Literature (CINAHL), National Library of Medicine (PubMed), Science Direct, Scientific Electronic Library Online (SciELO), SciVerse Scopus (SCOPUS) and Web of Science. Papers written in Portuguese, English or Spanish, regardless of year of publication, were identified in September 2018, and selected and read from October to December 2018.

Table 2. Number of manuscripts found in each database. Manaus, Amazonas, Brazil in 2018.

Search in the databases					
Databases	General articles	Articles after filters	Multiple appearances	Articles excluded	Articles selected
BIREME	5,626	4,823	98	696	09
CINAHL	1,987	1,740	73	167	07
PubMed	5,710	5,117	112	475	06
Science Direct	4,589	4,181	45	361	02
SciELO	248	211	12	25	00
SCOPUS	6,080	5,443	87	542	08
Web of Science	5,465	5,093	42	323	07
Total	29,705	26,608	469	2,589	39

Data Extraction and Synthesis

Extracting and synthesizing data from heterogeneous sources is a complex process. All papers were independently assessed by two researchers. The following information was abstracted from the included studies: general information about authors, publication date, country and language, method and recommendations. Synthesis of the data involved

categorizing: Educational actions/collective prevention, Actions with pregnant women, Avoid getting pregnant- before Zika virus infection and Professional advice.

RESULTS

A total of 29,705 papers were identified in the first consultation of the databases using the descriptor “Zika Virus”; 26,608 of these were excluded after using the filters of free access, full text, and language, employing a combination of Boolean operators, and applying inclusion and exclusion criteria. Another 469 papers were excluded because they appeared more than once; that is, the same paper was published in more than one database.

The titles, abstracts and key words of 2,628 papers were read and the full texts of 39 were selected. Two papers were excluded after reading the full texts because they did not address the objective proposed here, in that they exclusively addressed the care provided to children. Another 29 papers under the original protocols and protocol update modalities were excluded. Thus, a total of eight papers remained and composed the corpus of this review.

The synthesis described here is presented in the PRISMA flowchart **Figure 1** [24].

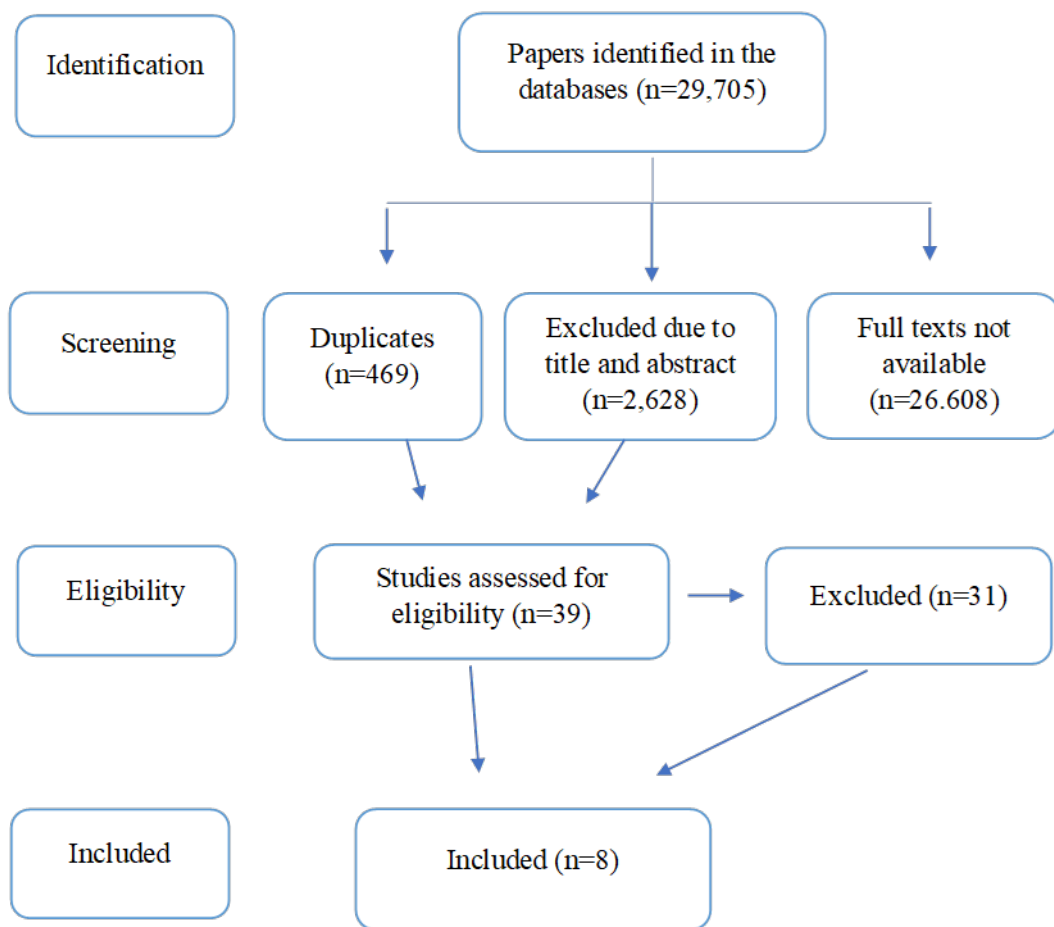


Figure 1. Flowchart presenting the identification and selection of papers published in the databases. Manaus, Amazonas, Brazil 2018.

Data were extracted from the papers included in the corpus of this review to compose a synthesis or analysis matrix to present a general overview of the content obtained [10], as shown on **Table 3**.

Table 3. Presentation of the papers that compose the corpus of this review. Manaus, Amazonas, Brazil 2018.

N	Author/Year/Title	Objective	Method	Recommendations
1	Kadri, MA (2016) Zika Virus in Brazil: A New Challenge for the	To inform health care providers, especially nurses	Does not mention the method used. The paper is based on the	- Pregnancy planning; - PCR testing – Mandatory by the Brazilian Ministry of Health;

	National Health System and Nursing Care.	involved with maternal and child health, about care.	information and definitions provided by the Brazilian Ministry of Health and by the Oswaldo Cruz Foundation.	<ul style="list-style-type: none"> - Having a multidisciplinary team to perform long term monitoring of child, mother and family; - Using individual protection to prevent mosquito bites, such as repellent, long-sleeved shirts, and trousers - Implementing control measures to eliminate the vector; - Public health actions to control and eventually eradicate the Zika virus in Brazil: (1) improve social life and environmental conditions to eliminate breeding sites; (2) financially support research to broaden knowledge about the disease and develop a vaccine; and (3) provide healthcare and social support to the families with children with permanent special needs accruing from the Zika virus infection.
2	Maharajan et al. (2016) Zika Virus Infection: Current Concerns and Perspectives	Provide a general and comprehensive critical overview of peer-reviewed.	Review	<ul style="list-style-type: none"> - Drug therapy; - Support care and bed rest; - There is no vaccine available; - RT-PCR from serum in the 7 days after the beginning of symptoms; - RT-PCR from saliva and urine. Urine can be used 10 days after the beginning of infection; - Eliminate mosquito breeding sites; - Decrease Mosquito-Human transmission, urban areas – individual protection; - Community surveillance; - Decrease human-vector contact by using repellent, biological and genetic control; - Take travel precautions in areas of risk for Zika virus infection; - Health education provided to people at risk of exposure to Zika; - If exposed to ZIKV, perform assessment and monitoring during prenatal consultations and recommend safe sex; - Prevent blood donor transmission of Zika virus; - Research addressing Zika virus; <p>Health providers should:</p> <ul style="list-style-type: none"> Pay attention to the early diagnosis of infection caused by Zika virus; Report suspected cases to public health authorities; Public education, emphasis on individual and environmental preventive measures; Advise couples at the risk of exposure to the Zika virus who are planning a pregnancy; Consult and advise travelers planning to visit endemic countries in regard to effective preventive measures, apply differential clinical diagnostic testing and be aware of neurological complications; <p>Differential clinical diagnostics</p>
3	Visovsky et al. (2016) Zika virus: emergency and aftercare of patients.	To describe how the transmission occurs; early and late evidence concerning clinical presentation, diagnostic method, and ways Zika virus spreads infection, as	Review study. Double-blind review verified by anti-plagiarist software.	<p>Zika prevention:</p> <ul style="list-style-type: none"> - Use of repellent; - Environmental changes (e.g., window screen); - Eliminate breeding sites; - Use protective clothing;

		<p>well as potential therapeutic targets to control microcephaly clinical manifestations; and emergency and support care. To recommend preventive interventions.</p>		<p>- Safe sex: using condoms during pregnancy when having sexual intercourse with people who are at the risk of being infected;</p> <p>Patient education as a responsibility of emergency nurses:</p> <p>Provide updated knowledge about Zika, especially to pregnant women at risk of having contact with infected individuals or traveling in areas of infection;</p> <p>Differential diagnosis;</p> <p>Educate patients, their families and travelers who suddenly became ill, presenting signs and symptoms of the disease, preventing the spread of the disease;</p> <p>Recognize signs and symptoms of infection caused by Zika among those exposed to the virus;</p> <p>Identify areas in the community with Zika outbreaks;</p> <p>Implement community education.</p>
4	<p>Turienzo and Brown (2016)</p> <p>What should midwives know about Zika virus infection?</p>	<p>To provide information about Zika and its known effects during pregnancy, the clinical control of pregnant women or those planning to become pregnant, and the implications of Zika for the practice of midwives in the United Kingdom.</p>	<p>Method identified not</p>	<p>Provisional guidelines:</p> <p>Pre-trip telephone counseling provided by health workers: clinical and traveling guidance;</p> <p>Clinical assessment of returning travelers with symptoms (including pregnant women reporting malaise)</p> <p>General information</p> <p>Guidance to pregnant women and those planning a pregnancy: avoid becoming pregnant while traveling to a country facing an outbreak of Zika virus infection and eight weeks after returning home.</p> <p>Nurses and midwives should:</p> <p>Discuss contraceptive methods and the use of condoms;</p> <p>Pregnant women traveling to areas of risk should take rigorous individual precautions to avoid mosquito bites and use condoms during sexual intercourse and/or refrain from sex during pregnancy;</p> <p>Clinical management of pregnant women exposed to the Zika virus:</p> <p>Midwives are recommended to ask all pregnant women and their partners about recent or planned trips in every prenatal consultation;</p> <p>Seek the support of specialist midwives, obstetricians and specialists in infectious diseases to assess women and their partners in regard to the Zika virus;</p> <p>Laboratory tests seeking evidence of Zika virus infection.</p> <p>Perform fetal ultrasound and refer patient to a fetal medicine service, if necessary;</p> <p>Pregnant women who present no symptoms two weeks after returning from an area affected by Zika virus do not need testing.</p> <p>Considering that the infection caused by Zika virus is asymptomatic in most cases, baseline fetal ultrasound is recommended within 28-20 weeks of gestation and then repeated in 28-30 weeks;</p> <p>Male travelers presenting symptoms associated with the Zika virus and their pregnant partners need Zika virus testing;</p> <p>Pregnant women exposed to infection caused by Zika virus whose fetuses were diagnosed with fetal</p>

				<p>microcephaly or other brain abnormalities are to be referred to a fetal medicine unit.</p> <p>Amniocentesis can be performed using RT-PCR six weeks after exposure to Zika virus if the woman is ≥ 21 weeks of gestation. This procedure should be only performed after thorough counseling due to its potential complications.</p> <p>Possibility to interrupt pregnancy among women infected by Zika virus and having a laboratory confirmation that their fetuses present significant microcephaly or brain abnormalities.</p> <p>Midwives should work together with a multidisciplinary team and thoroughly discuss with pregnant women the risk of spontaneous abortion or stillbirth and the possibility of interrupting the pregnancy and managing newborns.</p>
5	<p>Citil Dogan et al. (2016)</p> <p>The Zika virus and pregnancy: evidence, management, and prevention.</p>	<p>To analyze existing evidence exhaustively, reports and consensual guidelines regarding implications during pregnancy and the spread of the infection caused by Zika virus (ZIKV).</p>	<p>Bibliographic review using PubMed. Article based on the guidelines provided by the CDC of the Society for Maternal-Fetal Medicine (SMFM) and by the American Congress of Obstetricians and Gynecologists (ACOG)</p>	<p>RT-PCR testing in the first week after the beginning of symptoms. Prevent sexual transmission if there is exposure to the virus: use condoms or refrain from sex during pregnancy.</p> <p>Guide intended to health workers providing obstetrical care to manage pregnant women who were potentially exposure to Zika virus:</p> <p>Ultrasound assessment when there is suspected or confirmed maternal infection: suggested approach</p> <p>Magnetic resonance imaging (MRI): assessing fetal brain malformation;</p> <p>Recommendations to clinically manage symptoms during pregnancy;</p> <p>Postpartum and breastfeeding care and congenital screening of infection caused by the Zika virus;</p> <p>Individual and environmental preventive measures;</p> <p>Family planning;</p> <p>Biosafety: identify hazards of biological agents and equipment appropriate for individual and environmental protection.</p>
6	<p>Millet et al. (2017)</p> <p>Imported Zika virus in a European city: How to prevent local transmission?</p>	<p>Describe the first cases of ZIKV diagnosed in the city and analyze surveillance, prevention and control measures implemented to avoid autochthonous transmission.</p>	<p>Population-based observational, cross-sectional study conducted in Barcelona, Spain.</p>	<p>Individual protection against mosquito bites such as: appropriate clothing, repellent, home confinement during viremic period, and safe sex;</p> <p>Community preventive measures;</p> <p>Health services reorganization;</p> <p>Protocol for the surveillance and control of mosquito-borne arboviruses transmitted by mosquitoes;</p> <p>Nurses in the public health should be trained to fully identify arboviruses;</p> <p>Reorganize the hospital structure with physicians from specialized hospitals;</p> <p>Surveillance and early detection of infections caused by Zika virus;</p> <p>Communicate and disseminate the protocol to all the agents involved – having the arboviruses commission to disclose information through TV shows and news;</p> <p>Vector control;</p> <p>Educate patients to seek health services as soon as symptoms appear;</p> <p>Report all suspected cases of Zika virus;</p> <p>Provide counseling to travellers;</p>

				Report travels to regions with outbreak of Zika virus during prenatal consultations.
7	Affini et al. (2017) Conduct of Nurses About the Zika Virus in the Prenatal Consultation	To identify the knowledge of nurses providing care to pregnant women in Family Health Strategy Units in regard to preventive measures against the Zika virus.	Qualitative, deductive, descriptive and exploratory study conducted with 13 nurses. Semi structured interviews were used to collect data, which were analyzed using the Content Analysis technique.	Continuing education, training and updating workers; preventive measures to control vector. The authors present and discuss six categories: 1) How to manage nursing consultations during prenatal care in regard to suspicion of infections by the Zika virus: Follow the Women's Health Protocol provided by the Brazilian Ministry of Health; Report suspicions of infection caused by the Zika virus to the epidemiological surveillance; Perform detailed anamnesis and physical examination; Differential diagnosis; Instruct pregnant women to seek the health unit; Perform active search through home visits, intensifying instructions and reinforcing the need for women to attend prenatal consultations; Refer women to the PNAR (High Risk Prenatal Care) if infection is confirmed. 2) Instruct pregnant women to prevent infection caused by the Zika virus: by avoiding areas at risk; wearing long-sleeves shirts and trousers; using condoms, repellents, and window screens; and seeking the health unit in case of suspected infection caused by the Zika virus. 3) Provide guidance related to complications caused by arboviruses: Professional qualification; gather groups of pregnant women to provide orientation; exchange experiences; establish bonds between workers-pregnant women; promote adherence to prenatal care; and provide holistic care to pregnant women. 4) Have knowledge of the complications caused by Zika virus: microcephaly; CNS is susceptible during the entire period of pregnancy; congenital malformation; hearing and vision problems; mental retardation. Complications vary among children, as there can be motor, neurological, and/or respiratory problems. Refer to specialists according to the problem presented by the child. 5) Recommendations for clinical management: classification of risk; hydration, and monitoring. The physician is supposed to establish a differential diagnosis of dengue and Chikungunya; be attentive to the risk of bleeding of an obstetrical nature associated with the risk of abortion and low-weight at birth; Pregnant women with rash be investigated whether it is caused by the Zika virus: fetal neurological assessment with a recommendation to perform two extra ultrasounds between the 20th and 24th weeks and between the 32nd and 35th weeks of gestation. Drug treatment for the symptoms. 6) Insufficient knowledge to provide care to pregnant women with infection caused by the Zika virus: - Continuing education; - Training for workers to obtain new competencies: leadership, decentralized management; and self-management. Nursing consultation during prenatal care ensures quality care, contributes to decrease maternal-fetal morbidity and mortality, preventing and identifying potential congenital malformation such as microcephaly.
8	Santos et al. (2017)	To assess the competencies of	Quantitative, descriptive and cross-	Devise strategies to prevent and eliminate the vector; Prevent infection during pregnancy;

<p>Prevenção da infecção pelo Zika Virus nas gestantes. [Prevention of Zika virus infection among pregnant women]</p>	<p>Community Health Agents (CHA) in performing actions established by the Brazilian Ministry of Health during prenatal care of usual risk within the Family Health Strategy scope, in relation to preventing infection caused by the Zika virus during pregnancy.</p>	<p>sectional study. Data were collected from 14 teams of the Health Family Strategy using a three-part questionnaire: A (fighting Aedes aegypti); B (low risk prenatal care) and C (individual preventive measures against the Zika virus). Data were analyzed using cluster analysis and Fisher's Exact test.</p>	<p>Qualified and humanized prenatal care; Multidisciplinary approach on the part of health workers in order to provide holistic care to pregnant women; The authors also mention contributions to the nursing field, such as mapping the weaknesses identified in the work of CHAs. These agents are not nursing workers but are under the supervision of nurses, so that scientific evidence is needed to guide the quality of care delivery.</p>
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DISCUSSION

Present in over 70 countries and territories, the Zika virus has become a global threat because there is an intrinsic possibility of developing neurological congenital syndrome when the infection affects women during the gestational period and presents viral persistency. Therefore, the Zika virus represents a public health problem with a global impact. There was a decrease in suspected cases of ZIKV and warn of the risk of another severe epidemic in Brazil and in other tropical and subtropical countries. For this reason, implementing preventive measures to control vector density and encourage individual and collective protection is of paramount importance [24,25].

Educational actions/collective prevention

Identifying the breeding sites of vectors is a preventive measure that favors the control of vector density, mentioned in all the papers included in the corpus analysis of this review. Notes that public health actions and the control of infection caused by the Zika virus in Brazil are related to social life and environmental conditions conducive to the elimination of the mosquito breeding sites [6].

Strategies to prevent and control infection caused by the Zika virus require health workers to be qualified and prepared, considering the disease is often asymptomatic. This requires attention because the infections occurring among pregnant women, and the fact there is vertical transmission, result in neurological abnormalities in fetuses and Guillain-Barre syndrome in adults [26]. GBS is a demyelinating autoimmune pathology that causes acute or subacute flaccid paralysis [9]. Zika epidemics are particularly worrying because infection with this virus can cause Guillain-Barre syndrome and congenital central nervous system malformations including microcephaly [27,28].

Authors consider decreasing the mosquito-to-human spread of the virus in the urban area to be related to the control of vectors by eliminating potential breeding sites for Aedes aegypti and adopting individual protection to avoid contact with the vector. Aquatic environments are water storage contexts open to the sky and small puddles are places where mosquitoes can reproduce [29-31].

In the population-based study conducted in Barcelona, the Surveillance and Pest Control Service conducted an entomological inspection in public areas and in the patient's home. At the same time, it disseminated information concerning the areas, identifying and including areas of risk for the breeding of mosquitoes in the local Geographic Information System [31].

Orientation regarding how to eliminate potential breeding sites using chemical control as a measure to prevent their proliferation has been advocated in some studies [29,31,32].

Actions with pregnant women

In the report published by the CDC on measures to prevent infection by the Zika virus during pregnancy, was mention purchasing and providing Zika prevention kits as a community intervention strategy, mainly focusing on pregnant women [29]. The kit contains local-adapted health information, repellent, mosquito netting, condoms, and tablets to combat the mosquitoes [33].

The individual protection strategies included in the studies are intended to avoid insect bites in the viremic period, especially among pregnant women. For this reason, pregnant women should use safe repellents; insecticides, such as permethrin spray, on clothes; mosquito netting; light-colored long-sleeved clothing; avoid traveling to endemic areas; and use screens on windows and doors [29,32,34].

The risk of fetal congenital abnormalities is real, given that pregnant women may be infected by the Zika virus at any gestational age. Clinical guidelines to control exposure to the Zika virus during pregnancy are mainly intended to decrease the contact of people with an infected vector [29,31-32,34-35], while the following measures stand out:

- Clinical assessment of pregnant women returning from endemic areas with symptoms;
- Visiting a medical center when in an area of high prevalence of ZIKV, if showing signs and symptoms of the disease;
- Pregnant women with symptoms or otherwise with sexual partners traveling to outbreak areas, should practice safe sex (i.e., use condoms or refrain from having sexual intercourse);
- Abortion should be decided together with healthcare workers, taking into account the risk-benefit.

The clinical diagnosis of infection caused by the Zika virus is not reliable, because the disease's clinical and pathological characteristics can be confused with other arboviruses. The laboratory test recommended is RT-PCR, which should be performed together with other arboviruses in patients presenting the signs and symptoms of the infection, or those exposed to areas where there is active Zika virus transmission [6,30,32,34-35].

Material for testing should be collected in the viremic period, within seven days after the onset of symptoms. Urine can be collected for up to 20 days, after which [36].

After obtaining a laboratory exam confirming infection caused by the Zika virus, authors recommend performing baseline fetal ultrasound. If an ultrasound reveals the fetus has a congenital syndrome arising from Zika, the patient must be referred to a fetal medicine service and/or to a high-risk prenatal care service [34-35]. According to guidelines provided by the Brazilian Ministry of Health, if an ultrasound reveals no abnormalities, pregnant women should be monitored by a high-risk prenatal care service [37]. The Zika virus can infect pregnant women at any time during the gestational period. The first trimester of pregnancy, however, is when there is the greatest incidence of congenital malformation caused by the virus. Health providers should advise pregnant women and their families to be attentive to the risk that obstetrical bleeding may lead to the risk of spontaneous abortion, stillbirth or termination of pregnancy [34-35].

It is important of decisions made at the individual and social level considering social inequality, a lack of effective vector-prevention programs, the existence of abortion-restrictive laws in some countries, difficult access to contraceptive methods and sexual education programs, that is, that decisions may be made in a context of uncertainty, which may harm the health and wellbeing of pregnant women even more, requiring high-risk ante care [3].

Avoid getting pregnant – before Zika virus infection

We also found in this review advice for women who are planning a pregnancy: Avoid becoming pregnant if living or traveling to a country where there is active local ZIKV transmission and eight weeks after returning home. Nurses and midwives should recommend efficacious contraceptive methods and the use of condoms for couples when at least one partner has visited an area with active Zika infection [34].

Professional advice

Actions to prevent and control the spread of the Zika virus are implemented by a multidisciplinary team in order to develop protocols. Health workers play an essential role during prenatal care by screening pregnant women suspected of being infected with Zika virus, or confirmed to be infected. The studies [6,29-32,34-35] report that the responsibilities of health workers include:

- Reorganize public health services;
- Provide pre-trip telephone counseling - Clinical guidance and preventive care during travel;
- Educate pregnant women, their families and the community in regard to individual and environmental preventive measures;
- Stay up to date;
- Midwives are oriented to ask questions in all prenatal consultations to all pregnant women and their partners in order to obtain information and advise on recent and planned trips;
- Seek the support of specialists in infectious diseases when there is suspicion of infection by the virus;
- Midwives should work together with a multidisciplinary team;
- Discuss with pregnant women about the risk of spontaneous abortion or stillbirth and analyze the possibility of interrupting the pregnancy if infection by the Zika virus is confirmed;

- Midwives have the responsibility of staying up-to-date in regard to local guidelines and protocols to accurately assess pregnant women exposed to the Zika virus;
- Provide health education to patients, community and multidisciplinary team;
- Early diagnosis of infection caused by the Zika virus via laboratory exam when there is a suspicion of infection;
- Report the infection to the agency responsible for epidemiological surveillance;
- Differential diagnosis of other mosquito-borne infectious diseases, such as Dengue and Chikungunya;
- Public health nurses must know arboviruses, specific epidemiological situation, and make appropriate records of each case;
- Emergency nurses should be able to recognize the signs and symptoms of infection and appropriately refer patients;
- Health workers such as nurses, midwives and CHAs should be aware of the neurological complications associated with the Zika virus and its social and economic impact on families and society^[6,29,32,34-36].

The study carried out in the south of Minas Gerais, Brazil, and assesses the competencies of CHAs in the development of their responsibilities as established by the Brazilian Ministry of Health^[37]. Weaknesses were identified in the work performed to combat *Aedes aegypti* in relation to vector control. The authors mention the responsibility of nurses working in the Family Health Strategy to supervise these agents and seek scientific evidence to ground the delivery of quality care^[38].

Neurological disorders can be diagnosed during pregnancy. The virus has a tropism to the neuronal cells at any stage of a pregnancy, affecting neuronal precursor cells, isolated in the brain tissue and cerebrospinal fluid of children with congenital syndromes^[39]. Therefore, there is a need to support research financially and establish worldwide collaboration to expand knowledge of the disease and develop a vaccine^[6,29].

Note that, even though the term Zika virus originated in consultation with databases, totaling 29,705 papers, specific studies addressing the care provided by nurses to families and pregnant women and the prevention and control of this infection are still incipient. This fact should be noted because the first study addressing the Zika virus dates back to 1947, while the first outbreak occurred more than ten years ago. Thus, training nurses to observe and acquire knowledge of emergent diseases in society, as well as epidemics, is an important professional commitment that must be ethically fulfilled through education, research and dissemination of knowledge.

CONCLUSION

A small number of studies was obtained after applying inclusion and exclusion criteria, as few papers reported the care provided by nurses or nursing care provided to families and pregnant women aiming to prevent and control infection caused by the Zika virus.

The papers that compose the corpus of analysis in this review do not report the specific actions of nurses. The reports included: care in regard to the environment; individual protection of pregnant women; guidance provided to travelers; differential diagnosis in relation to other viral diseases; education provided to the nursing staff, families and pregnant women; health care and social support provided to families with children with permanent special needs arising from infection caused by Zika virus; and mandatory reporting of suspected and confirmed cases of the disease.

Considering that the professional nurse performs clinical practice in various care services is essential to participate in clinical research, especially multicenter. This will unveil new nursing techniques and technologies for the prevention and control of Zika virus infection, especially in pregnant women. As well, assess the economic and social impact of this infection.

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