

**PRACTICES AND INTEGRATED ACTIONS ON ARBOVIROSIS IN THE
EDUCATIONAL CONTEXT OF JAGUARIBE-CE**

***PRÁTICAS E AÇÕES INTEGRADAS SOBRE AS ARBOVIROSES NO CONTEXTO
EDUCACIONAL DE JAGUARIBE-CE***

***PRÁCTICAS Y ACCIONES INTEGRADAS SOBRE ARBOVIROSIS EN EL CONTEXTO
EDUCATIVO DE JAGUARIBE-CE***

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ABSTRACT: Arboviruses affect thousands of people, being a serious public health problem. Health education contributes to raising awareness among the population by providing concrete information on combating and preventing these diseases. In this perspective, the work aimed to investigate the knowledge and educational practices of teachers who teach in state high schools present at the headquarters of Jaguaribe/CE on the subject of arboviruses. The research was characterized as a case study, with a qualitative approach. Data collection took place through an online questionnaire and data analysis was performed using Bardin's content analysis. From this, it was found that the perception and knowledge of teachers, in relation to arboviruses, were below expectations, making it difficult to work on such a relevant topic in the local scenario, which requires greater and better training/training. teacher for the correct dissemination of information.

KEYWORDS: Health education. Virus. School. Teaching practice.

RESUMO: *As arboviroses atingem milhares de pessoas, sendo grave problema de saúde pública. A educação em saúde contribui na sensibilização da população por levar informações concretas de combate e prevenção para essas doenças. Nessa perspectiva, o trabalho objetivou averiguar os conhecimentos e as práticas educativas dos professores que lecionam nas escolas estaduais de ensino médio presentes na sede de Jaguaribe/CE sobre a temática arboviroses. A pesquisa caracterizou-se como um estudo de caso, de abordagem qualitativa. A coleta de dados se deu por meio de questionário online e a análise dos dados foi feita por meio análise de conteúdo de Bardin. A partir disso, constatou-se que a percepção e o conhecimento dos professores, em relação às arboviroses, ficaram abaixo das expectativas, tornando-se difícil trabalhar um tema tão relevante no cenário local, o que se faz preciso maior e melhor capacitação/formação docente para correta disseminação das informações.*

PALAVRAS-CHAVE: *Educação em saúde. Vírus. Escola. Prática docente.*

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RESUMEN: Las arbovirosis afectan a miles de personas y constituyen un grave problema de salud pública. La educación sanitaria contribuye a la sensibilización de la población aportando información concreta para combatir y prevenir estas enfermedades. En esta perspectiva, el estudio tuvo como objetivo investigar el conocimiento y las prácticas educativas de los profesores que enseñan en las escuelas secundarias estatales presentes en la base de Jaguaribe/CE sobre el tema arbovirosis. La investigación se caracterizó como un estudio de caso, con un enfoque cualitativo. Los datos fueron recolectados a través de un cuestionario en línea y el análisis de los datos se realizó a través del análisis de contenido de Bardin. A partir de esto, se encontró que la percepción y el conocimiento de los docentes, en relación con los arbovirus, estaban por debajo de las expectativas, dificultando el trabajo sobre un tema tan relevante en el escenario local, lo que hace necesaria una mayor y mejor formación docente para la correcta difusión de la información.

PALABRAS CLAVE: Educación para la salud. Virus. Escuela. Práctica docente.

Introduction

Diseases transmitted by *Aedes aegypti* have become one of the world's major public health problems, becoming one of the main tropical diseases in the Americas. Such diseases are popularly known as arboviruses.

For Silva *et al.* (2015, p. 28, our translation),

tropical diseases can be understood as those that stand out in tropical regions or in the tropics, and are directly linked to the region's climate, socioeconomic, environmental and political conditions.

Tropical diseases that will be addressed in this investigation include Dengue, Chikungunya and Zika. Although yellow fever is also inserted in arbovirus diseases, it will not be addressed at this time, as the Northeast is not an endemic area for this disease.

The word arbovirus is derived from the term arbovirus which, according to Rosa *et al.* (2000, p. 3, our translation),

are viruses transmitted in nature, through biological transmission between susceptible hosts by hematophagous arthropods or from arthropod host to arthropod host.

The authors conceptualize arboviruses as "diseases caused by a group of ecologically well-defined viruses called arboviruses".

Thus, all diseases that have an arbovirus as a transmitter are called arbovirus. However, we will highlight, at the moment, Dengue (DENV), Chikungunya (CHIK) and Zika (ZIKV). They can be transmitted to man through the vector form, more common, through the bite of the

female of *Aedes* (vector), but also through vertical transmission, whose mother passes the virus to her child during pregnancy, or transfusion of contaminated blood (BRASIL, 2019).

In recent years, arboviruses have been widely disseminated, causing the impacts of the Unified Health System (SUS) and society in general, bringing many disorders to those who are infected, such as absence from work, lack of beds in hospitals, lack of adequate care, in the case of Zika infection in pregnant women, the risk of the child being born with microcephaly, among other problems.

The predominance of mosquito foci has a higher incidence in residential properties, constituting the highest percentage in deposits such as drums, buckets, tanks, clay filters, pots or basins. Therefore, it is of paramount importance that health education reaches the population through Endemic Agents (ACS) and Community Health Agents (ACE) in their routine home visits, in order to address this recurring problem for years (BASTOS *et al.*, 2019).

In addition to the health education carried by health professionals to the population in general, in a home way, education professionals can and should also perform this role with their students, addressing relevant information about arboviruses in the classroom. The partnership between education and health needs to take place in order to unify the actions of the sectors, bringing adequate subsidies for students and their families, in order to contribute to the reduction of cases of arboviruses in Brazil.

However, it is necessary to think of working together, health and education as a tool for changing behaviors and habits of society. Thus, health professionals take the necessary and important information and education professionals disseminate the information to students and family members, so it informs society in general.

According to Silva *et al.* (2015), education must gain prominence in coping and controlling arboviruses, to achieve positive results it is necessary to change the practices of those involved in the process, in this case the population, social mobilization can bring the necessary knowledge for this change to actually happen. Thus, it is important to bring important information to all involved, be it teachers, students, family members. Education plays a key role in contributing to the control and fight against arboviruses at the local level.

The School Health Program (PSE) was carried out through partnerships between schools and Basic Health Units, where each UBS serves schools within its territory of operation. The health professionals participating in this program perform actions frequently within the schools. In this environment, nurses, dentists, psychologists, doctors, ACS, ACE perform actions according to their area of activity, such as social mobilization, lectures, workshops, brushing, sexual orientation, among others.

Health education is inserted in the legal documents of Brazilian education, such as the National Curriculum Parameters (PCN) and the Common National Curriculum Base (BNCC).

In PCN, health education is a cross-cutting theme, which, according to Brazil (1997, p. 66), aims to "know and care for one's own body, valuing and adopting healthy habits as one of the basic aspects of quality of life and acting responsibly in relation to its health and collective health". More recently, the cross-cutting themes have been reformulated and, in the BNCC, they have become the same as Contemporary Transversal Themes (TCT). They had an expansion of the thematic areas, with health education as one of them.

In the meantime, it is preponderant to know how this theme is being addressed in the educational context, especially with regard to the theme of arboviruses. This said, the focus of this theme on school pedagogical practices takes on an important dimension in the teaching and learning process, so as to enable a change in behavior and community practices in general, in relation to the care of mosquito breeding sites.

In view of the above, the following question arises: What is the level of knowledge of teachers and how do they approach the theme of arboviruses in an interdisciplinary way in the schools in which they operate? Thus, this research aims to investigate the knowledge and educational practices of teachers who teach in state high schools present at Jaguaribe/CE's base on the theme of arboviruses.

Methodological path

The work, as for the objectives, fits into descriptive research. According to Gil (2002, p. 42, our translation), the research of this type "has as its primary objective the description of the characteristics of a given population or phenomenon or, then, the establishment of relationships between variables". As far as the approach is, it is characterized as qualitative research. Prodanov (2013, p. 70, our translation) "considers that there is a dynamic relationship between the real world and the subject, that is, an inseparable link between the objective world and the subjectivity of the subject that cannot be translated into numbers".

The research was conducted with teachers from three public high schools, located all in the city of Jaguaribe-Ceará being a vocational high school, one of integral high school and a regular high school. In general, there are 60 teachers who teach in high school at the city of Jaguaribe, from all areas of knowledge, however, of these, 27 answered the questionnaire, which corresponds to 45% (n=27) of teachers. These participants are in the age group ranging from 26 to 57 years of age. Regarding gender, 74% (n=20) are female and 26% (n=7) were

male. All have higher education, however, 11% (n=3) are masters and 59% (n=16) are specialists.

The option for data collection was the *online questionnaire*, through *Google Formularies*, mainly due to the COVID-19 pandemic. At first, we had contact with the principals of the schools, in which they volunteered to socialize *the link of the questionnaire* in the group of teachers of the schools, in which it was available for response for a period of 30 days. This questionnaire (APPENDIX A) was composed of 20 questions, 14 objective questions, including socioeconomic characterization, knowledge about arboviruses, as well as what pedagogical practices are used to work on the arbovirus smear virus in the classroom and 6 subjective questions aimed at the research theme, which addresses the teachers' previous knowledge about what arboviruses are, if they underwent training to work on the theme, the difficulties and strategies used, what is the perception of the teacher and what the expected result.

The Microsoft Excel program was used to analyze the data *of the objective questions*. The *software* was used in tabulating the data and generating graphs or tables for a better understanding of the reader. On the subject, on the subject, content analysis based on Laurence Bardin's vision was used.

According to Bardin (2016, p. 39, our translation) content analysis is

a set of communications analysis. It is not an instrument, but a range of paraphernalia; or, more rigorously, it will be a single instrument, but marked by a wide disparity in forms and adaptable to a very wide field of application: communications.

Corroborating the discussion, Janis (1982, p. 53, our translation) summarizes that content analysis

provides precise means to describe the content of any type of communication: newspapers, radio programs, movies, daily conversations, free associations, verbalized, etc. Content analysis operations consist of classifying signals that occur in communication according to a set of appropriate categories.

Considering the existence of the system of the Research Ethics Committees (CEP) and the National Research Ethics Commission (CONEP), the work is ethically based on resolution No. 510 of April 7, 2016, all participants agreed to participate in the research, marking *in the online questionnaire the acceptance* of the free and informed consent term (Appendix), to agree to participate in the research, based on Art. 2, § V, already in chapter II deals with the necessary ethical principles. Furthermore, the identification of teachers' names was omitted in order to

preserve their identities. To distinguish the statements, we chose to use the terms "Professor 1", "Professor 2", based on the sequence in which they answered the online questionnaire.

Results and Discussion

In this topic, the teachers' answers about the knowledge of teachers of the Jaguaribe/CE state school system about basic knowledge about arboviruses are discussed and discussed; about the epidemiological reality of the municipality; on formative processes to address the theme in the classroom; if in the schools that teach work projects focused on the theme; what pedagogical strategies they use when addressing the theme; and what difficulties they encounter when working on the theme in the classroom.

Teachers' knowledge of arboviruses

The first part of the questionnaire refers to the teachers' basic knowledge about arboviruses. Initially, the main arboviruses were questioned, and 100% Dengue (n=27), Zika 96% (n=26) and Chikungunya 89% (n=24) were identified. In addition to these, yellow fever scored 63% (n= 17), which is not endemic to our region, but is also an arbovirus.

When asked about which mosquitoes transmit arboviruses in Brazil, the reports are a little concerned because 48% (n=13) indicated that they did not know what mosquitoes transmit arboviruses in Brazil. Thus, despite being a subject much debated and worked on in schools, there are still teachers who do not know who transmits arboviruses.

Fonseca Júnior *et al.* (2019) mention that *Aedes (Stegomyia) aegypti* and *Aedes (Stegomyia) albopictus* are important vectors of viruses causing emerging and reemerging diseases such as dengue, Zika, chikungunya and yellow fever. Knowing the mosquitoes that transmit arboviruses in endemic regions is a basic need that everyone should know, especially teachers who work on the theme with their students. Therefore, this misinformation makes us reflect how these teachers work the theme with the students, without having basic knowledge about the subject.

The processes of education every day become complex in the face of new knowledge and education increasingly assumes the process of construction and sharing of knowledge, which they reproduce in social life in several areas, in a process of social interactions, through language (RANGEL-S, 2008).

However, Rangel-S (2008) warns that the lack of knowledge on the part of the population in relation to arboviruses may be a result of the lack of communication and education, aimed at prevention, which prioritize only simplistic information about the vector.

When addressed about what can be possible breeding sites that mosquitoes can use for their reproduction, most understand that any tank with still water can be a possible breeding site, type tires in disuse 100% (n=27), buckets 100% (n=27), unprotected water boxes 96% (n=26), unused pools 96% (n=26), drums 96% (n=26), pots 92% (n=25), unprotected bottles 92% (n=25), tinas 88% (n=24), plants with water 85% (n=23), *cacimbão* 85% (n=23), tanks discovered 81% (n=22), garbage 77% (n=21). The deposits less indicated as breeding sites were, cisterns 18% (n=5), the clay filter 29% (n=8) and drains 44% (n=12), bromeliads 51% (n=14), these less cited also have their risk potential, and the responsibility of the responsible for the residence take care of their deposits that accumulate water.

Brazil (2007) describes the life cycle of the *Aedes* mosquito. It is divided into four phases: egg, larva, pupa and adult. The mosquito after reaching adulthood, lasts on average 35 days. Females perform 4 to 6 postures with about 100 eggs at a time. The eggs are very resistant and can last up to 15 months dry until it comes into contact with water to hatch. Thus, any deposits with still water are a probable breeding ground for arbovirus-transmitting mosquitoes, so the importance of maintaining any deposit that can accumulate water, capped, thus making it impossible to reproduce. In this sense, Valle *et al.* (2015) describe that the most efficient action to control arboviruses is the fight against the mosquito, removing potential foci of eggs from the insect.

Then, when asked if they know the epidemiological reality of the municipality today, the answers were surprising, because only 26% (n=7) of the teachers answered that they follow the epidemiological data. This fact generates a huge concern, because, over the years, the theme is worked on in schools and, in view of the above, we still see that there is a lack of integration between schools, institutions and programs developed within the municipality, such as the School Health Program (PSE) which is responsible for being present within the schools of the municipality taking the information and developing actions of the Secretary of Health in the present schools of the municipality.

From this perspective, Assis *et al.* (2013, our translation) cites that

greater commitment of the public authorities to the educational strategies that constitute dengue control policies is indispensable so that there is no discontinuity in actions. Only a quality, continuous and planned educational process can maintain prevention and, in fact, promote impact so that epidemic peaks of the disease are avoided.

In line, when asked if they have already participated in any training on arboviruses, the answers were that 78% (n=21) did not have training to deal with the theme in the classroom, but in the other hand 22% (n=6) indicate that they have undergone some training, this shows that the information is not reaching all those involved who are part of the schools. Likewise, when asked if the Department of Education encourages/offers training for teachers with the theme, 59% (n=16) point out that they never participated in any training.

Armindo *et al.* (2011, p. 10, our translation) they say that "disease prevention actions need to be shared, that is, produced together with the people to whom they are intended in the search for the joint construction of knowledge and a more effective and lasting learning". These trainings should stimulate updating and teacher training on the theme, so that teachers can be grounded to be able to approach the theme in a way that contributes to the prevention and control of local arboviruses.

It is necessary a greater involvement between institutions, both public and private, so that the largest number of people possible to cope with arboviruses can be encompassed, not only in the school context, but involving the whole society.

In the municipality, at each beginning of the school year, schools are convened by the Secretariat of Education to develop projects aimed at preventing and combating local arboviruses, whether with lectures, walks and gymkhanas. These actions coincide with the winter framework, where there are more deposits that can become future breeding sites for the mosquito, these actions have the role of bringing information to students and the community around the school.

In this scenario, teachers are the mentors and, in partnership with the students and the community around the school, need to develop relevant pedagogical practices focused on the theme, to sensitize students and the community to adhere to the projects developed in the school in combating and controlling these arboviruses. These teaching activities will be detailed in the following topic.

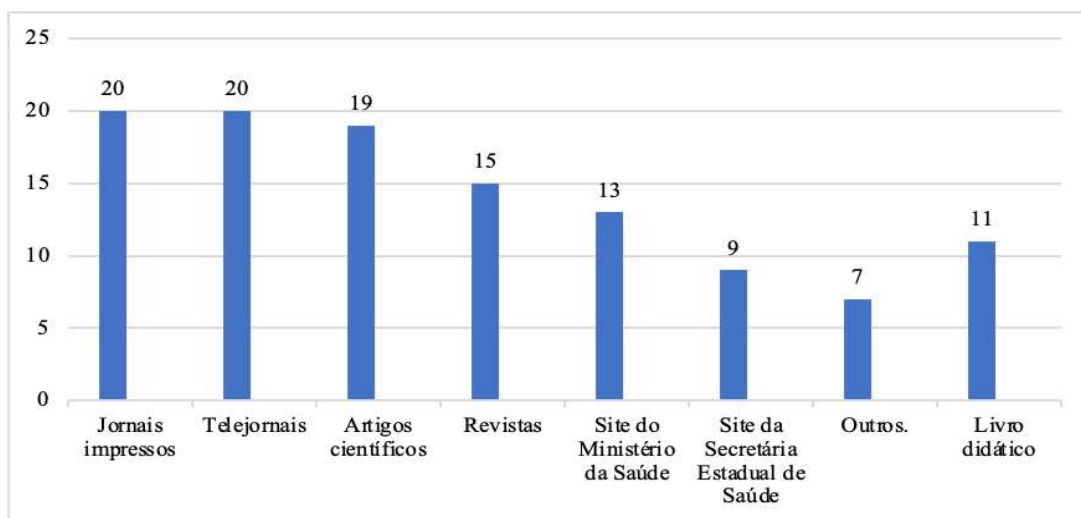
Pedagogical practices on Arboviruses

Understanding the importance of the school in preventing and combating arboviruses, the research participants were asked whether educational projects in which arboviruses are contemplated are developed in the school in which arboviruses are contemplated; the answer was that 52% do not know if the school has projects focused on the theme; the other 48%

pointed out that the school develops important projects focused on the theme. This is also the case, we can see that those involved in these projects are only half of the teachers of these schools, a significantly low number, since the theme is worked on every beginning of the school year.

When asked about the sources of information they use to work on the subject, the most common answers were: printed newspapers, television news and scientific articles; as shown in Graph 1.

Graph 1 - Sources of information on arboviruses scored by basic education teachers³



Source: Survey data (2021)

From the answers, it is possible to realize that they seek information and data from very comprehensive external sources, which is not wrong. However, there should be a search for data closer to the reality around the school and, consequently, to the municipality. Knowing the local epidemiological data is of paramount importance to work arboviruses, because the school can develop actions according to the needs of the neighborhood or the community in which the school is inserted (CATÃO *et al.*, 2019).

For the approach of the theme in the classroom, the teachers pointed out as didactic strategies: the dialogued exhibition class 78% (n=21); teaching with research 56% (n=15); text study 52 (n=14); seminars 41% (n=11); discussion groups 41% (n=11); case study 26% (n=7); problem solving 22% (n=6); conceptual map 22% (n=6); discussion by computerized means 22% (n=6); workshop/workshop 19% (n=5); the study directed 15% (n=4); another 11% (n=3);

³ First bar: Newspaper; Second bar: TV News; Third bar: Scientific articles; Fourth bar: Magazines; Fifth bar: Ministry of Health Website; Sixth bar: State Secretary of Health Website; Seventh: Others; Eighth bar: Textbooks.

panel 11% (n=3); brain storm 11% (n=3); dramatization 11% (n=3); portfolio 7% (n=2); forum 4% (n=1); lectures/webinar 4% (n=1).

In addition to those mentioned by teachers, they can also be used: theater, lectures, videos, field classes, science fairs, puppets. (MELO; FEITOZA, 2010; VIVEIRO; DINIZ, 2010). Gueterres *et al.* (2017) describe that learning in the school environment, when it comes to integral health promotion, has the role of developing skills and competencies focused on collective health in students.

In the methodological approach of teachers to students on the subject, for those who have more difficulties as a theme, they can request partnership of the School Health Program - PSE, which should be present in both state and municipal schools and arboviruses are one of the themes to be worked on by the program and by schools.

When asked if working on this theme in schools, it actually contributes to the prevention and control of arboviruses in the municipality; And in their entirety, they answered yes and some answers caught the eye, like the ones listed below.

Yes, the school can serve as an incentive vector to encourage students to act in their home and their community by avoiding the proliferation of disease transmitters (Professor 2, our translation).

Yes. Because with knowledge, in fact, the student becomes an agent of change in his neighborhood, residence and social environment as a whole (Professor 3, our translation).

Yes, why prophylactic measures are carried out with information, and all information is valid and constructive, especially when it comes to such a relevant topic (Professor 23, our translation).

Given the placements presented, we see that in the description of these teachers, the educational actions developed in schools can stimulate the changes in behaviors of students and their families, directly contributing to the prevention of arboviruses.

In the view of Amorim *et al.* (2021, p. 5, our translation), the approach to themes "that encompass the relationship between health and the environment should directly affect changes in individual and collective attitudes and behaviors, with the recognition that these constructs are ubiquitous and, therefore, can directly have repercussions on health".

From the demonstrated, we see that they believe that the actions developed in schools strengthen the work in the prevention of local arboviruses, as well as raise awareness of the problem of mosquitoes transmitting arboviruses, in order to take the information that shows the epidemiological reality, thus making it, a community aware and informed of what must be done

agents to combat endemic diseases – ACE have theoretical and practical knowledge of the actions that are developed by the municipality throughout the year and know the municipal epidemiological reality, being able to add more knowledge to teachers, helping them to work on the theme with more theoretical and practical basis and contribute to the actions developed by schools.

It is notorious that in the years 2020 and 2021, they got out of control due to the COVID-19 pandemic, education and health were some of the sectors that were hit hard. Thus, with the rapid changes in the current scenario, new competencies and a new profile of teachers were required.

Corroborating the discussion Diesel *et al.* (2017, p. 2, our translation) suggest that,

urgent need to rethink teacher education, having as its starting point the diversity of knowledge essential to its practice, thus transposing the technical rationality of an instrumental doing to a perspective that seeks to resonate it, valuing the knowledge already constructed, based on a reflexive, investigative and critical posture.

It is a fact that the theme needs to be more addressed within schools, but not only because of this in the curriculum, but to work responsibly, with quality seeking partners who add knowledge to teachers, for the school, for students and for the community, improving the habits and behaviors of those involved.

Final considerations

The perception and knowledge of teachers regarding arboviruses in high schools present in the municipality of Jaguaribe was below expectations, because some of the interviewees do not even know the term arbovirus, making it difficult to work on such a relevant theme in knowledge and actions to combat these diseases and that should involve the whole society.

In relation to the didactic strategies pointed out, all can be used to work the theme easily, but what worries is how it will be worked if the teacher has difficulty dealing with the theme, since some mention that there is a lack of didactic material, adequate training, technical support. Therefore, it is necessary to work on the potential of the teacher, taking the necessary knowledge for these professionals to approach the theme in an interdisciplinary way, so that it is not only expected of health professionals.

Among the difficulties mentioned by the teachers are the lack of didactic resources, technical support, continuing education, the time available to work on the theme, the lack of knowledge of the epidemiological reality of the municipality. Therefore, it is a fact that an

urgent interaction is made between the institutions in order to repair this distancing of information, as soon as possible, so that it can remedy these difficulties in relation to epidemiology.

In view of the above, it is clear that it is necessary to treat the theme in an integrated way with the school institutions, in order to reduce the discrepancy of knowledge of teachers in relation to arboviruses, so that, in fact, the school contributes to the change of behavior, starting with the teacher, the students and the community in general.

Furthermore, there may also be a closer relationship with the Municipal Health Department, especially the epidemiology sector, through the School Health Program - PSE, so that the members of this program can contribute to a specific training on arboviruses, as well as production and distribution of quality information materials, which can be used in the school environment and in local communities.

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