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ENVIRONMENTAL EDUCATION IN CONTROLLING THE PREVENTION OF AEDES AEGYPTI: AN APPROACH TO GRADUATES FROM BIOLOGICAL SCIENCES IN THE MUNICIPALITY OF SANTANA DO IPANEMA – ALAGOAS

Environmental education in the control of aedes aegypti prevention: An Approach to Biological Science Undergraduates in the Municipality of Santana do Ipanema – Alagoas

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SUMMARY
The main focus of this study is to analyze whether there is an approach to the topic of *Aedes Aegypti*in the subject of environmental education in the municipality of Santana do Ipanema, from the biological sciences course, with the main objective of knowing environmental education actions related to public health and quality of life practiced, as alternatives in controlling the prevention of*Aedes aegypti*of students graduating in biological sciences from the State University of Alagoas, in Santana do Ipanema. The present research justifies why in Brazil, dengue is a disease that causes more than 20 thousand deaths for every 550 thousand hospitalized due to dengue. While the state of Alagoas is present in the states with the highest rates of dengue cases. The present study consists of exploratory and descriptive research. The results show that students believe that Environmental Education-EE is important for controlling the*Aedes aegypt,*but only 11% had the problem discussed in the EA discipline and suggests several actions for the municipality of Santana do Ipanema to combat*Aedes aegypt.*

Keywords: Dengue; Undergraduates; Perception.

ABSTRACT
The main focus of this study is to analyze whether there is an approach to the theme of Aedes Aegypti control in the discipline of environmental education in the municipality of Santana do Ipanema, from the biological sciences course, with the main objective to know environmental education actions related to public health and quality of life practiced, as alternatives in the control of the prevention of Aedes aegypt of undergraduate students in biological sciences at the State University of Alagoas, in Santana do Ipanema. The present research justified why in Brazil, dengue is a disease that causes more than 20 thousand deaths for every 550,000 hospitalized due to dengue. While the state of Alagoas is present in states with higher rates of dengue cases. The present study consists of exploratory and descriptive research. The results show that the students believe that Environmental Education-EE is important for the control of Aedes aegypt, but that only 11% had the problem discussed in the EE subject and suggests several actions for the municipality of Santana do Ipanema to fight Aedes aegypt.
Keywords: Dengue; Graduates; Perception.

1. INTRODUCTION

Environmental education is defined as processes by means, where the individual and the community construct it, with social values, skills, knowledge, attitudes and competencies with an emphasis on environmental conservation, quality of life and

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sustainability, according to the National Environmental Education Policy (2021). From this perspective, the prevention of diseases transmitted by vectors such as mosquitoes, environmental education is essential to collective responsibility and awareness, properly packaging and disposing of waste for collection, avoiding the disposal of objects such as tires and others that accumulate water in vacant lots or inappropriate locations and even demanding preventive and remedial actions from the public authorities to address identified problems. Dengue is an arbovirus that has become a serious public health problem in Brazil. It is normally transmitted in urban areas, as this environment favors the factors that favor the proliferation of mosquitoes and the transmission of the disease.

According to the World Health Organization (WHO, 2012), dengue is one of the biggest public health problems in the world, estimates indicate that there are around 50 to 100 million infections caused by the disease every year. Figueredo (2011), states that approximately 550 thousand patients require hospitalization and of these 20 thousand die as a result of dengue. Guzman and Istúriz (2010), present 4 different serotypes of the virus in Brazil (DENV-1, DENV-2, DENV-3, DENV-4), belonging to the genus Flavivirus, family Flaviviridae.

Dengue is characterized as a rapidly spreading disease, being acute viral (BRASIL, 2009). The transmission cycle begins with the bite of a female Aedes aegypti on a person infected with the disease. Thus, the virus multiplies in the vector, having the capacity to transmit the virus as long as it survives. The contamination of a new individual occurs through the bite of the female carrying the virus, and after a few days of incubation the first symptoms appear in the individual: high fever, headache and yalgia, with or without the presence of a rash and/or itching (BRASIL, 2010).

The State Department of Health (SESAU 2016) of Alagoas released an overview of all records of dengue infection in Alagoas. According to the survey, six municipalities are already in an epidemic situation due to dengue, to which Santana do Ipanema was included. It is important to highlight that the parameter to classify a municipality in an epidemic situation is the incidence rate of more than 300 cases of dengue reported for every 100 thousand inhabitants.

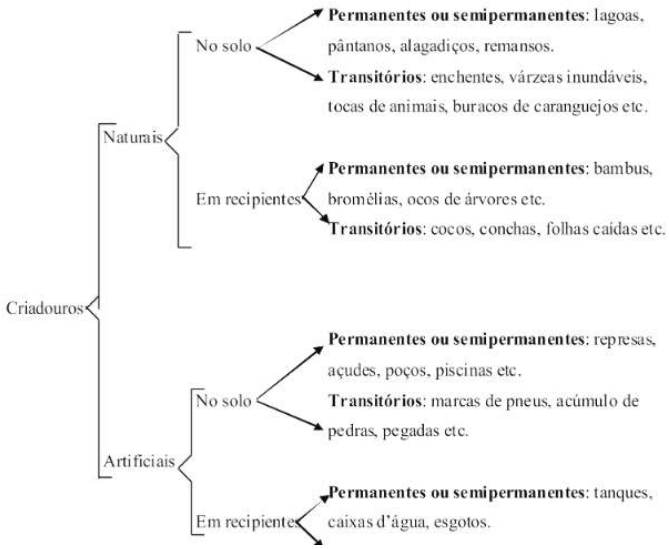
Throughout the state of Alagoas, according to Sesau (2016), from January to a week before the end of April, more than 6,000 cases of dengue were reported, with Santana do Ipanema having 22 cases, while Arapicara is considered the second largest city in the state of Alagoas, recorded 16 cases. In 2015, during the same period, the number of registered cases

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is smaller, accounting for 4,069 notifications of the disease. Thus, as an alternative to reducing the rate of the disease, the state relies on population support along with environmental education.

Within the scope of Federal, State and Municipal Legislation, great advances have been made in relation to environmental issues, more specifically in the consolidation of Environmental Education. As a reference to this evolution, we have, in the 1930s, the Water Code (Decree 24,643 of 1934) (BRASIL, 1934) and the first version of the Forest Code (Decree 23,793 of 1934), which acted as a primitive form of legal support regarding the use of natural resources (BASSANI*et al.*2019)

In Brazil, dengue is a disease that causes more than 20,000 deaths for every 550,000 people hospitalized for dengue. While the state of Alagoas is present in the states with the highest rates of cases. In this way, Santana do Ipanema presents static data on dengue. Losing lives to a disease is a setback in education. It is necessary to bring knowledge and access assistance to the most vulnerable families, as economic conditions are determining factors for dengue cases. The spread of*A. aegypti*occurs from containers that accumulate water, these containers are divided into several classifications as shown in the figure below:



Source: We read*et al.*2010

Environmental education is a strong alternative for discussing issues, actions and means that promote positive impacts on society in a general context, so it is essential to spread awareness to everyone, including getting to know those who have direct contact with these issues. In this way, the present study aims to understand environmental education actions related to public health and quality of life practiced, as alternatives in the

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control of the prevention of*Aedes aegypti*of students graduating in biological sciences from the State University of Alagoas, in Santana do Ipanema.

2 THEORETICAL FOUNDATION

Within the scope of Federal, State and Municipal Legislation, great advances have been made in relation to environmental issues, more specifically in the consolidation of Environmental Education. As a reference to this evolution, we have, in the 1930s, the Water Code (Decree 24,643 of 1934) (BRASIL, 1934) and the first version of the Forest Code (Decree 23,793 of 1934), which acted as a primitive form of legal support regarding the use of natural resources (BRASIL, 1934).

In the 1960s, the 34 Forest Code was revoked (BRASIL, 1965), and with the new legislation, Permanent Preservation Areas (APPs) and Legal Reserves were established. Later, Ecological Stations and Environmental Protection Areas (APAs) were established, through Federal Law 6,902 (BRASIL, 1981a), as interpreted by its Art. 1, scientific research is ensured in order to stimulate education for conservation, introducing the notions of man's belonging and recognition to Nature.

The National Environmental Policy, set out in Federal Law No. 6,938/81 BRASIL, 1981b), describes Environmental Education, in its Article 2, item X, as stimulating the community in the sense of dynamic action in safeguarding the environment. The writing of this Redimensionada in its articles, the National Environmental System (SISNAMA) and the National Environmental Council (CONAMA)

It is known that ancient people viewed the environment with respect to different forms of life, dealing with resources in order to guarantee their subsistence. However, with the advent of modernity, there was a new meaning in the ways of thinking and acting and establishing a capitalist rationality, based on the objectification of economic profit, generating an environmental crisis, as stated by Mexican Enrique Leff:

> Environmental problems, poverty and health degradation come from the rationality of economic growth that puts the maximization of commercial profit before human health, and not from simple population growth. (LEFF, 2015, p. 314).

Reigota (2012) criticizes the responsibility of the anthropocentric view of the world. According to the author, man does not recognize himself as part of Nature. Distance yourself

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so that it can appropriate it and permanently degrade the environment, in its favor. It also claims that ethics, in this process, in Environmental Education, is fundamental, to deconstruct this vision.

Furthermore, we have a culture of discarding and generating solid waste in our society. Nothing in the world is meant to last, much less forever. Today's useful and indispensable objects are, with very few exceptions, tomorrow's refuse. Nothing is really necessary, nothing is irreplaceable. Everything is born with the mark of imminent death, everything leaves the production line with an “expiry date” attached. (BAUMAN, 2005, p. 122).

In this sense, Corrêa (2012), corroborates the authors, when mentioning that human beings try to obtain improvements in their living conditions, during the exercise of capitalism. However, this unrestrained use causes damage to the entire ecosystem and obviously to oneself, causing diseases to emerge due to the exacerbated proliferation of vectors and microorganisms, through the application of these actions.

The word “dengue” is of Spanish origin and means “squeamishness”, “manha” which, in turn, is the way or state in which the person is. It is an acute febrile disease of viral etiology that persists in nature through the human – Aedes aegypti – human cycle, with humans being the source of infection and reservoir (BRASIL, 1997).

3 METHODS

The present study consists of applied research, of an exploratory nature, which, according to Gil (2002, p.41):

> (...) aims to provide greater familiarity with the problem, with a view to making it more explicit. It may involve bibliographical research or interviews with people experienced in the researched problem. It generally takes the form of bibliographical research and case study.

The research will also use the descriptive method, which aims not only to relate the central analysis variables, as well as to present information that can serve as guidelines for actions to transform reality.

> Descriptive research is research that analyses, observes, records and correlates aspects (variables) that involve facts or phenomena, without manipulating them. Human or natural phenomena are investigated without the interference of the researcher who only “seeks to discover, with as much precision as possible, the frequency with which a phenomenon occurs, its relationship and connection with others, its nature and characteristics”. (CERVO; BERVIAN, 1983, p.55)

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In this sense, the results will be presented in a qualitative way, based on the collection of information from secondary sources, including a bibliographic review. As research sources, in order to collect the theoretical framework, books, articles and websites will be used, which are related to the topic. For primary data, a semi-structured questionnaire produced through the*Google forms*and sent to participants via the WhatsApp application.

Research participant

Santana do Ipanema, is a city belonging to the state of Alagoas, has a territorial area of 437,875km² with a population of approximately 48,000 people (IBGE 2020). In this city, there is the State University of Alagoas which offers a course in the area of health (biological sciences), in this way, the target audience becomes students of the undergraduate course who have already studied or are studying the subject of environmental education (students from 05 or 06 periods above).

Data collect

Data collection was carried out through a semi-structured questionnaire, with questions that guide understanding environmental education actions, quality of life of Santanenses and characterization of the target audience. According to the list below:

TARGET AUDIENCE CHARACTERIZATION QUESTIONS
1. Age 2. Period 3. Sex
DISCURSIVE QUESTIONS TO SUPPORT THE RESEARCH
1. How important is it to study Environmental Education (EE) to control the*Aedes aegypti*in Santana do Ipanema? (before applying the questionnaire, it is important to include an excerpt with impactful data on dengue in Santana do Ipanema-AL, that is, to present the problem of the study) 2. Among the EA actions, directly related to public education and quality of life, which one(s) have you used or practiced during EA classes, as an alternative to fighting the dengue mosquito? 3. Among the EA actions to combat the mosquito that causes dengue disease, which one(s) is most appropriate for the municipality of Santana do Ipanema? Comment. • **Community mobilization**to solve specific problems in communities; • **Meetings**leadership to analyze and search for solutions to socio-environmental problems;

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- **Local activities**trading products and services made in communities, such as handicrafts, food, clothing and others, valuing local knowledge and practices;
- **Development of cultural and artistic activities**that value and rescue local knowledge and practices, such as music, theater, dance, games and other manifestations integrated into collective social representations*;
- **Prevention of diseases**transmissible by vectors such as dengue, leptospirosis, rabies and other zoonoses, enabling the organization of actions that are based on the balance and quality of the environment;
- **Requirement of public policies**aimed at socio-environmental aspects, safety, education, transport, health, digital inclusion, improving communities' access to available resources and quality of life;
- **Training of community and environmental education agents**that encourage and guide the local formation of action and communication networks that facilitate communities in seeking joint solutions to identified environmental problems;
- **Content production**and educational materials, such as pamphlets, newspapers, radio programs, interviews, lectures, workshops and courses that encourage healthy practices and community collaboration.
- **Prevention of endemics and epidemics**transmitted by vectors such as insects, rats, abandoned animals, etc.

4 RESULTS AND DISCUSSION

Frame – 1 Reports from the sample public and the importance of Environmental Education (EA) for controlling the*Aedes aegypti*in Santana do Ipanema.

The interviewees approached the question according to their understanding. We can highlight that the importance of EA for controlling the*Aedes eagypti*is based on awakening or developing critical awareness among citizens, knowing the impacts and damages of the disease, as well as knowing and developing ways to prevent and combat the disease.

Importance	**Stories**
Awaken or develop awareness among citizens	"EA is very important, it is necessary to develop or raise awareness among each citizen, as we can have improvements in environmental practices such as control over*Aedes eagypti."* "AE can make people more aware, in the case of Aedes eagypti, it can make people not leave the water."
Know the impacts	"Environmental education helps communities understand and perceive more directly and clearly the harmful effects of mosquito proliferation and the diseases they cause." "The importance lies in understanding the ecological factors that allow the existence of the mosquito, associated with human actions (or

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	absence in actions), what favor The dissemination of it in the urban environment, as well as the social issues that lead to these actions, to support popular action."
Develop forms of prevention and combat	"Through environmental education it is possible to know specifically the main problems faced in a given region and develop education and prevention strategies that can adapt to their reality". "Only studying EA to learn about ways to prevent and combat the dengue mosquito. As well as, daily practices with environmental themes, informative lectures for communities, production of content for dissemination and support for community members, above all, significantly minimizing this disease."

Source: Authors 2021.

One of the graduates reports the following:

> "The importance lies precisely in the knowledge that can be obtained about vector control measures, since despite dengue fever being a disease that has long been endemic in most of Brazil and educational measures are carried out, there is a lack of greater collaboration between the Department of Health and Education. Therefore, it is extremely important to identify that the problem is linked to the accumulation of water in stagnant containers, but knowing the reason and how the vector manifests itself can modify the increase in dengue cases. However, what applies is that it is not enough to just understand the effects of environmental education, it must be applied daily in routine."

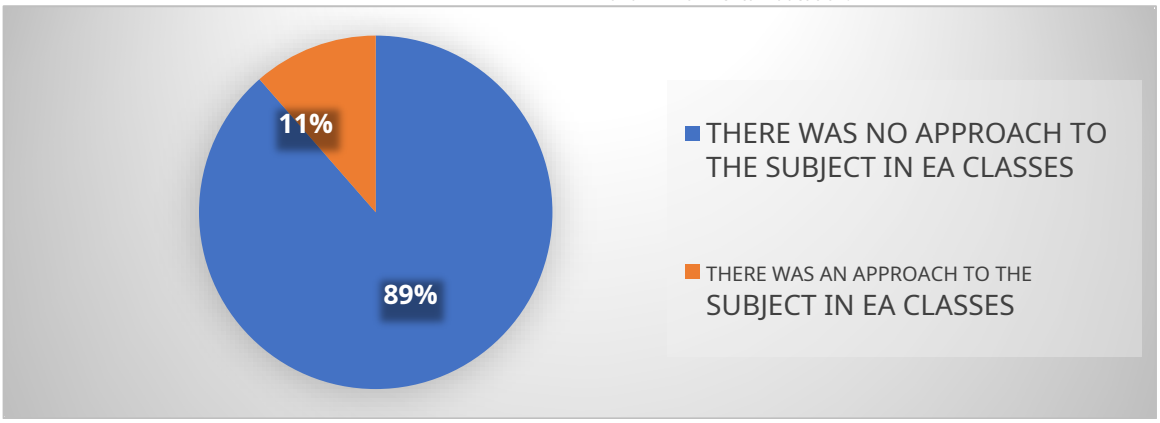
Furthermore, other research participants state that:

> "Environmental education allows us to train people who are aware and critical about the environment, sustainability, preservation and conservation. Thus, with this knowledge, people can be aware of daily practices that allow them to control mosquitoes, such as: covering water tanks, not accumulating trash/plastics that allow water to accumulate, using repellents, among others. . All these joint actions and with everyone collaborating, can allow mosquito control"

> . **"**Environmental Education contributes positively to the control of Aedes aegypti, since raising awareness about pollution actions and disposal of waste such as plastic bags and others in an appropriate location can reduce favorable conditions for the mosquito's life cycle. "

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Graph – 2 Approach to the subject of control and combat *Aedes aegypti* in the municipality of Santana do and Environmental Education.



is 2021.

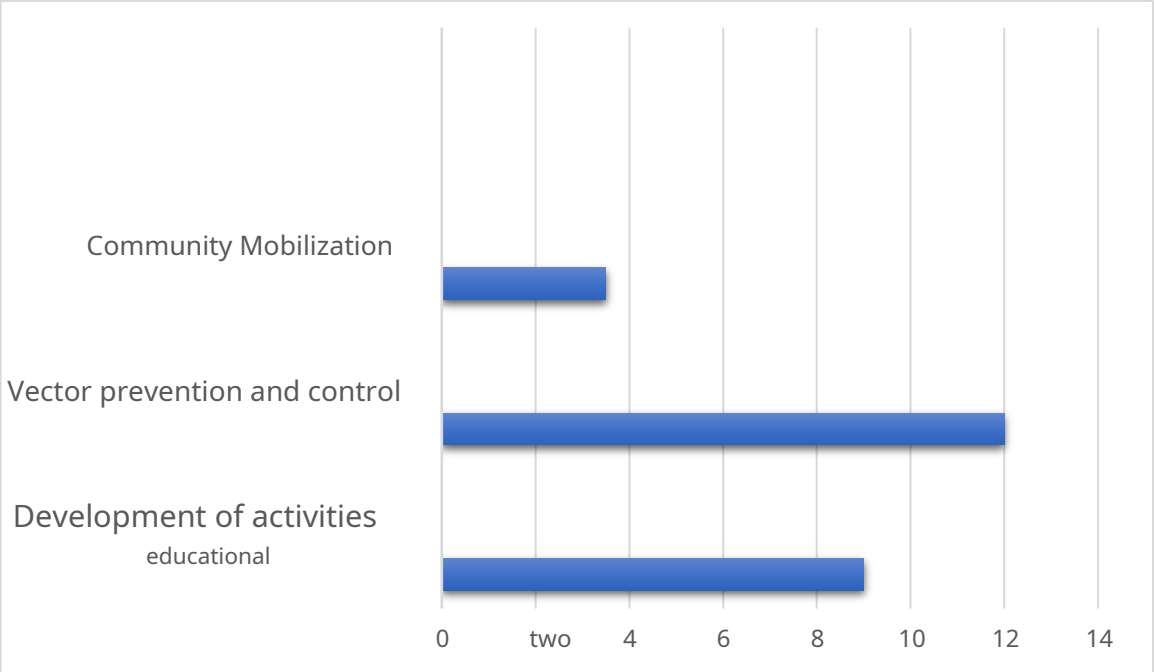
According to the graph above, 89% of students say that the subject of the *Aedes aegypti* was not addressed in the environmental education discipline, even though this is a factor that generates an epidemic in the state and becomes an important issue for the community. Although the participants demonstrate knowledge of actions that help minimize the problem, addressed in graph 3. The students brought the following positions:

> *"I didn't use it specifically to combat mosquitoes, I didn't have the opportunity to work on this problem in environmental education classes."*
>
> *"I never worked on the vector or the disease with EA"*
> *"Unfortunately there was nothing focused on this topic"*

In the study based on information leaflets and publicity about the disease, carried out by Lenzi and Coura (2004), they concluded that knowledge about the vector is not as important as other aspects. This can generate insecurity among the population, as it is difficult to know how to identify and investigate the vector infestation if one does not have knowledge about it, but it also reinforces that the school space is a suitable environment to discuss such issues. For Burgan (2012), the implementation of techniques and methodologies to address dengue in the school space is valid, as the subject should not be approached superficially, as, in this way, the student's learning will be superficial. The school is directly related to the critical development of citizens. It is necessary to debate and problematize issues arising from human actions in a critical and analytical way. Health education is an aspect as important as any other and must be addressed clearly and effectively, as this approach will affect the student's conduct in the social environment in which they live.

Graph -3 Main actions to combat mosquitoes *Aedes Aegypt no* municipality of Santana do Ipanema according to the perception of Environmental Education students.

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Source: Authors 2021.

According to the students participating in the research, the main actions to combat the mosquito that causes Dengue are community mobilization, prevention and control of vectors and mosquito development hotspots, in addition to educational activities with the community. As the following reports demonstrate:

> *"We need to resolve many health issues that involve both the environment, animals and humans. People need to be educated, informed about these precautions to avoid dengue fever, as well as other health diseases, which depend on the collective. More energetic public policies, more discussions, more involvement of the population, I believe would alleviate these problems a little."*

> *"The best way to combat mosquitoes is through primary health. Through awareness in communities and especially in schools. It is difficult to change an adult's custom, but raising awareness in a child is easier and through this, they can make their guardians aware."*

> *"Environmental education actions can and should encompass the entire society in all its aspects: traders, the population and prominent public figures. And actions can occur from all perspectives."*

Oliveira (2014) and other authors used walks with sound as a strategy for educational actions adopted by students of the PET-Saúde project at the State University of Santa Cruz, Ilhéus-BA, whose objective is to inform, in a playful way, the forms of prevention and combat of dengue. During the walk, information leaflets were distributed throughout the city streets. The study developed in the cities of Itaboraí and Rio de Janeiro, by Fereira (2012), investigated the use of theatrical language to characterize

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conceptions of agents involved in dengue prevention. Through the interaction between Art and Health Sciences, the authors aimed to create favorable environments for discussing the determinants of health.

FINAL CONSIDERATIONS

Environmental education is seen as a link to discuss dengue disease, although the vast majority of participants claim that the topic is absent in the EA discipline, while they attended higher education. Although they highlight the main actions to combat the mosquito that causes Dengue, they are community mobilization, prevention and control of vectors and mosquito development hotspots and, in addition, educational activities with the community. Finally, it is important to address this issue in future EA offerings.

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