Revista de APS
ISSN: 1809-8363 (*on-line*)

Original Article

Photovoice and the Eco-Bio-Social approach with students: an Innovative strategy for Aedes aegypti control and prevention

Photovoice e a abordagem Eco-Bio-Social com estudantes: uma estratégia inovadora para controle e prevenção do Aedes aegypti

Roberta Duarte Maia Barakat, Suyanne Freire de Macêdo, Thereza Maria Magalhães Moreira, Virna Ribeiro Feitosa Cestari, Valter Cordeiro Barbosa Filho, Andrea Caprara

Authorship

Metadata

ABSTRACT

Photovoice employs photography as a dialogue element that transcends the understanding of an image. This study consolidates knowledge and innovative action in mobilizing students to control and prevent the *Aedes aegypti* vector. This vector's control is of global interest, and the Eco-Bio-Social approach points out sustainable and effective strategies in this regard. We describe the experience of schoolchildren and adolescent students with Photovoice based on discussions about the photographs produced. The collected data were analyzed and processed by the IRaMuTeQ software, and the outcomes were compiled and integrated by thematic construction from the students' narratives. We identified two central cores in the narratives: mosquitoes and water. Photovoice awakened the participants' critical environmental management perspective and was provenly an adequate tool to drive proactivity and promote social and community responsibility, gathering scientific knowledge and social commitment.

KEYWORDS: Arboviruses. Public health. Sustainable development. Community Participation. Schools.

RESUMO

O *Photovoice* utiliza a fotografia como elemento de diálogo que transcende a compreensão de uma imagem. Este estudo consolida conhecimentos e ações inovadoras na mobilização de estudantes para controle e prevenção do vetor *Aedes aegypti*. O controle desse vetor é de interesse global, e a abordagem Eco-Bio-Social aponta estratégias sustentáveis e eficazes nesse sentido. Descrevemos a experiência de escolares e adolescentes com o *Photovoice* a partir de discussões sobre as fotografias produzidas. Os dados coletados foram analisados e processados pelo *software* IRaMuTeQ, e os resultados foram compilados e integrados por construção temática a partir das narrativas dos estudantes. Identificamos dois núcleos centrais nas narrativas: os mosquitos e a água. O *Photovoice* despertou nos participantes uma perspectiva crítica de gestão ambiental e revelou-se uma ferramenta adequada para impulsionar a proatividade e promover a responsabilidade social e comunitária, reunindo conhecimento científico e compromisso social.

PALAVRAS-CHAVE: Arboviroses. Saúde pública. Desenvolvimento sustentável. Ação comunitária para a saúde. Escolas.

INTRODUCTION AND METHODS

Combating the *Aedes aegypti* vector and its transmitted diseases, specifically Dengue (DENV), Chikungunya (CHIKV), and Zika (ZIKV) arboviruses, has been relevant because an unprecedented escalation in the spread of arbovirus cases has been identified in more than 100 countries in the Americas, Africa, Europe, and Asia in the last six years, affecting millions of people of all age groups. Studies prove that prevention and control are directly related to the mobilization of affected communities. The challenges involve developing tools and strategies to prevent potentially epidemic infections[1].

The eco-bio-social approach has been considered a suitable scale-up strategy to build an ecosystem that deals with complex health topics and issues, leading to people's well-being and quality of life. It has such potential because complex principles, such as Systemic Thinking, Transdisciplinarity, and Knowledge for Action[2], are considered, strengthening awareness and empowerment, social participation, equity, and sustainability of public health actions.

Another strategy to create harmonious relationships, information, and organization of individuals in the community, Photovoice, has been an unconventional technique to research challenging or stigmatized topics in vulnerable populations. It has grown in popularity in public health, medicine, nursing, social work, psychology, and health education[3], especially in the last three decades. This innovative technique may help prevent and control the *Aedes aegypti* vector in several countries, such as Brazil, because it enables individuals to represent and expose their community experiences through photographs, providing socially vulnerable people a voice through images and enhancing political and social community changes. It identifies, takes ownership, and assesses the needs, transcending the diagnosis of being ill-healthy, encouraging reflection, and apprehending perceptions as a stimulus for debate. Thus, Photovoice is a technique that can implement the principles of the eco-bio-social approach by fighting against inequality and integrating knowledge, scholars, and local interested parties (communities) to grasp the social determinants of health and promote healthy and sustainable environments[4]. It provides essential elements for constructing policies that promote equity among social groups.

Historically, schools are a relevant interactive and practicing space in the relationships between the subjects who share this setting, implying the transmitted diseases to the school community[6]. Education is immersed in intersectoral actions promoting health and supporting integration, participation, and sustainability in the environment as per the school environment. Thus, health-related issues (e.g., *Aedes aegypti* vector control and prevention) emerge in classrooms and school contexts, involving educators, students, and families concerned about better health conditions, environment, and quality of life.

To our knowledge, no studies have addressed how Photovoice can be used with students as a strategy for arbovirus prevention and control in schools. Bridging this gap is particularly relevant because reality dialogues with the teaching-learning process; the formation of students is committed in its entirety, assuming intellectual, political, social, physical, and cultural dimensions. Photovoice, through research, allows building knowledge and places students at the core of the learning process, sharing dialogues with the community.

Given the above, this paper aims to analyze the use of the Photovoice to support *Aedes aegypti* vector control and prevention strategies based on the eco-bio-social approach to schoolchildren and adolescent students.

This qualitative, participatory research-action study employed the Photovoice technique. It was examined in the 1990s by Caroline Wang, professor and researcher at the School of Public Health at the University of Michigan, and Mary Ann Burris, associate researcher at the School of Oriental and African Studies at the University of London. They proposed to include in the investigative process community-based interventions to train socially vulnerable groups to identify, represent, and strengthen the resources of their communities with techniques and photographic records[4]. A research action finds favorable grounds when researchers expand their investigations beyond academic limits, where the interaction between investigators and the subjects involved in the studied situation is explicit[7].

This descriptive study is nested in multicenter research conducted in three countries (Brazil, Colombia, and Mexico) funded by the International Development Research Center (IDRC-Canada) that focused on building ecosystem health initiatives to combat vector-borne diseases[8]. The study was conducted under the guidelines of the Declaration of Helsinki and approved by the Research Ethics Committee of the State University of Ceará (opinion no. 2.248.326; CAAE no. 70826017.8.0000.5534). The study design, ethics, interim analyses, and risks to which participants were exposed were assessed.

A community intervention, a case-control study, was developed from 2017 to 2020 in four districts of Fortaleza, Ceará, Brazil, in two intervention and two control areas. Previously, a preliminary entomological survey was conducted from 15/09/2017 to 27/10/2017 to identify potential *Aedes aegypti* breeding sites to support the research intervention. Endemic Disease Control Workers (ACE) from Fortaleza, Brazil, visited each household of the four districts to conduct the survey.

The intervention areas were defined as Conjunto Ceará I and Vila Manoel Sátiro districts, and the control areas were defined as the Prefeito José Walter and Granja Portugal districts. The study areas were selected from the cases with the highest incidence of DENV, CHIKV, and ZIKV reported by the regular surveillance system in the last three years. The intervention and control areas were evaluated as homogeneous regarding socioeconomic status, health coverage,

household type, access to water supply, sewage, and other district infrastructure characteristics, such as roads and leisure areas.

The study was run in two municipal schools located in two districts, Conjunto Ceará I and Vila Manoel Sátiro, in the Regional Administration's Health Territory V, which consists of 18 districts in Fortaleza, the capital of the state of Ceará. The population dwells in one of the regions with the highest social inequalities and low income in the municipality, thus more exposed to social and health vulnerabilities. It is the most densely populated and highly impoverished region in the capital. It is one of the regions with the youngest population profile in Fortaleza, with 44% of the population under 20 years of age and the second-highest illiteracy rate (17.83%). The districts were selected as they were nested in the intervention area and because of municipal governance[9].

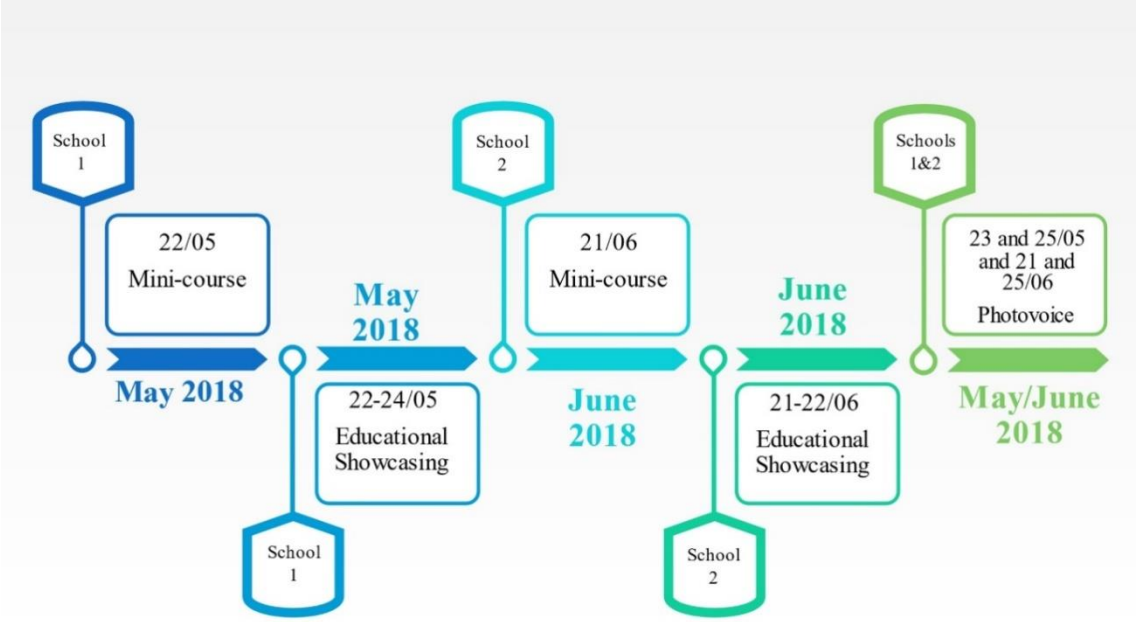
The project was presented to the principals of the two schools. We selected students among those who manifested their interest and agreement to participate. At least three representatives from each class were selected by the teachers by convenience sample, considering the criterion of greater participation in classes. Students signed an Assent Term and obtained permission from their parents or legal guardians by signing an Informed Consent Form (ICF). Both terms also included waiving the photographic material's intellectual property rights.

The activities carried out in educational showcasing in schools were extended to all students of all grades, faculty, staff, and the community, with free access to the information exposed. Both schools belong to the Municipal Education Secretariat of Fortaleza. School 1 has 16 classrooms and 74 employees. In 2017, it had 33 classes and 546 students, 4 Youth and Adult classes with 179 students, and 11 students with special needs. School 2 has 13 classrooms and 45 employees. In 2017, it had 24 classes, seven of which were kindergarten classes (pre-school) with 135 students, 17 elementary I schools (1st to 5th grade) classes with 459 students – nine of which with special needs.

The age group appropriate to the application of data collection techniques, specifically Photovoice, justified the selection of the participants. We included participants with adequate cognitive and critical development for the discussions, well-versed in handling a cell phone camera, and interested and available to contribute to the intervention.

The study was conducted from early 2017 to late 2019, performing a semi-structured sociodemographic questionnaire, an educational showcase, a mini-course, Photovoice, and focus groups. Figure 1 shows the timeline with activities conducted equally in the two schools. The risk of embarrassment was observed in the interviews, conversation wheels, culture circles, and training, which were minimized by the researchers' mediation and the setting's preparation to prevent external interference.

Figure 1 - Timeline of educational actions in schools



Source: Authors.

The same activities were conducted in both schools. After signing the Terms, the questionnaires were completed in groups of five students. Their sociodemographic profile, prior knowledge of the topic (about *Aedes aegypti* and the morbimortality it produces, and ways of controlling and combating the vector with community surveillance) were characterized, providing the researcher with the students' perspective on the issue.

Then, educational showcasing events were held, displaying models and educational material in a social space with free access and visitation by the school group and the community. To this end, a partnership was established with the State Health Secretariat of Ceará and the Municipality of Fortaleza, which contributed with stands and models of breeding sites representing the vector reproductive cycle, larval cycle with live vector, and printed promotional materials (posters, folders, and stickers), a professional dressed as a mosquito, and three professionals to guide the exhibited material.

Mini-courses were held simultaneously with the showcasing of educational events, with eight hours of theoretical-practical classes in rooms provided by the schools' pedagogical coordinators. A Photovoice practical, hands-on exercise was staged in the last four hours of these courses to consolidate students' knowledge. The courses' content was explained lucidly and dialogically, and the short courses aimed to work with theoretical and methodological assumptions of the eco-bio-social approach to health for interventions geared to the control and prevention of arboviruses (Dengue, Zika, and Chikungunya) transmitted by the vector *Aedes aegypti* in the public health setting. Chart 1 describes the short course stages.

Chart 1 – Description of the stages performed in the mini-course

Course stage	Description
1) Reception	Welcoming students and presenting the objectives of the activities Presentation of the educational video prepared by one of the research collaborators for children and adolescents entitled: "The life cycle of *Aedes aegypti*"
2) Culture Circle and group formation	Vocabulary universe is fostered by the generating question: What do you understand by the Eco-bio-social approach? Students were divided into small groups. Then, they spontaneously expressed and recorded in writing their previous knowledge and first brainstorming impressions about the Eco-bio-social approach.
3) Group thematization	Thematization and discussion grounded on the understanding expressed by the participating students through the vocabulary universe (words)
4) Case study: "*Joãozinho's birthday party*"	Case study: "*Joãozinho's birthday party*". Students performed collective readings in the groups, identifying situations that reflected the subject in the dialogued showcase and building the debate: What issues could trigger discussions around Joãozinho's birthday party? Socializing issues between groups and synthesis of the directed study.
5) Dialogued showcase: "*A perspective on the Eco-bio-social approach*"	The students remained in the groups. Presentation of the theoretical-methodological assumptions of the eco-bio-social approach to health, correlating them with the proposals of health promotion for interventions in the school environment to address the prevention and control of arboviruses in the current public health setting. Presentation of health promotion's socio-historical construction based on the ecosystem theory, reflecting on sensitization, empowerment, social participation, equity, sustainability, and quality of life. Stimulating the acquisition of healthy daily habits that positively influence and encourage individual and collaborative care. After the presentation, the students actively clarified their doubts about the topic.
6) Dialogued showcase: "*I know what you did last summer*"	Theme presented on the entomology of *Aedes aegypti*: historical context of the three arboviruses Dengue, Zika, and Chikungunya; symptomatology of diseases transmitted by *Aedes aegypti*; *Aedes aegypti* life cycle; similarities and differences between *Aedes aegypti* and *culex*; primary prevention and combat actions.
7) Dialogued showcase: "*Endemic worker and participatory surveillance*"	Presentation of the Endemic Worker's activity and its importance in preventing and combating *Aedes aegypti*. The implementation of active surveillance actions to control the vector in the school environment and its impact on the community.
8) Directed Study: Photovoice	Presentation of the photovoice technique, explaining concepts and the main objective in this context, discovery and photographic records of potential *Aedes aegypti* breeding sites within the school environment, and identifying and registering through photographs images associated with the content studied in the short course.
9) Closing and evaluation of the short course.	Acknowledgments and unsolicited evaluation of the short course.

Source: prepared by the authors

After the educational showcasing and the mini-course, students reproduced original photographs of the indoor school setting for four hours. Thus, considering the State Law

prohibiting cell phones in schools, the principals previously authorized each participant to bring a cell phone or digital camera to the school to implement the Photovoice (State Law number 14.146/2008).

The photographs translated the students' apprehended knowledge into an image, which was expressed in four focus groups, two in each school. The agendas of the focus groups followed the presentation of the ideas and their meanings, which were transcribed in full. To this end, the following triggering question was adopted: "*What motivated you to take these photos*?"

The textual analysis and relevant themes in the statements of the included students were performed using the *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (IRaMuTeQ) software, an open-access program developed in Python language, which uses provided features of the R statistical software[10]. Initially, classical textual statistics were explored, using basic lexicography and searching for specificities by groups of words. We opted for the Similarity Analysis and the elaboration of the Word Cloud as a multivariate analysis.

The similarity analysis was the ideal mathematical model for the study as it enabled identifying co-occurrences between words and facts. Graph theory indicates connectedness between words, structuring a textual corpus, and distinguishing common parts and specificities of descriptive variables. The word cloud was used to identify keywords in the statements, as it enables grouping words and graphically organizing them according to their frequency[11].

Finally, we compiled and integrated the results to provide an overview of all the material through thematic construction according to the students' experiences identified in the statements. The eco-bio-social approach is grounded on ecosystem theory and the International and National Health Promotion Conferences. It promotes reflection on sensitization and empowerment, social participation, equity, sustainability, and transdisciplinarity. Its practical proposal is to develop intervention strategies aligned with policies to improve urban populations' quality of life. Thus, we adopted this approach to summarize themes on combating diseases and risks of exposure to infections caused by *Aedes aegypti.*

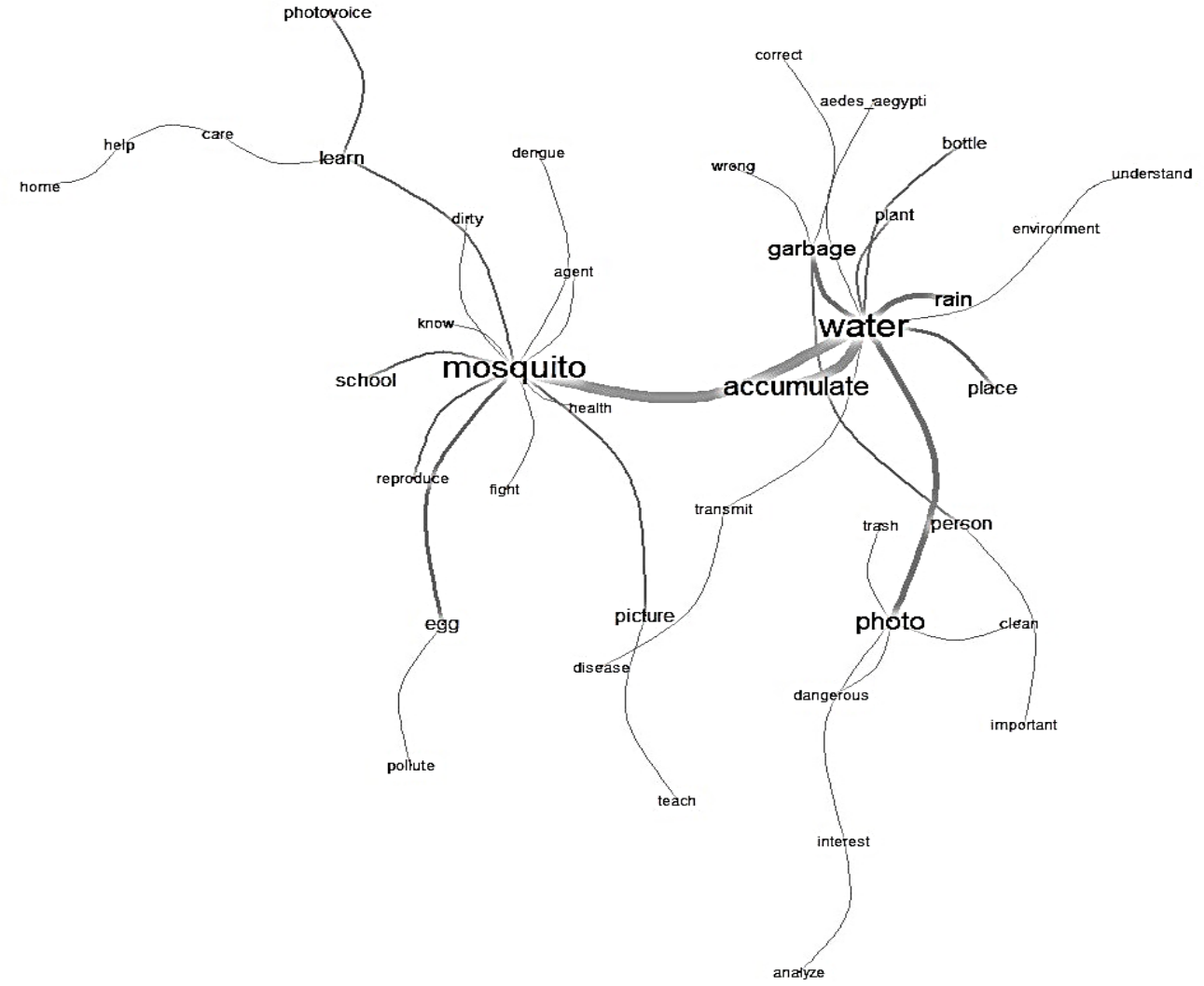
RESULTS

Fifty-five students regularly enrolled in Elementary School I (6-10 years), School 1, and Elementary School II (10-16 years), School 2, were invited to participate in the study. They were from the morning and afternoon shifts. Forty-three of the 55 students participated in the focus groups, but the corpus was formed through the statements of 29 participating respondents.

Two significant central cores were observed in the students' experience of controlling and combatting *Aedes aegypti* from the analyzed statements evidenced during Photovoice: "mosquito" and "water". The "mosquito" core is permeated by ramifications formed by individual

words closely related: *agent*, *dengue*, *school*, *reproduce*, and *health*. Three peripheral axes emerge from it: *learn*, *picture*, and *egg*. Linked to learning, Photovoice emerges as a learning strategy for participants. Three words stand out from the "water" core: *accumulate*, *rain*, and *garbage*. This core highlights different places and forms of water accumulation expressed by the participants. The ramification of this core includes potentially dangerous places for the reproduction of dengue mosquitoes, as shown in Figure 2.

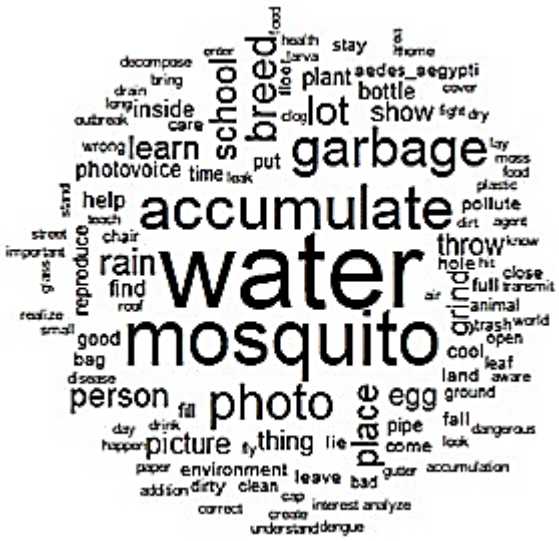
Figure 2 – Analysis of similarity in the statements of students participating in the research



Source: prepared by the authors

"Water" was more frequent term in the corpus (87 times) of the word cloud, followed by "mosquito" (59 times), "accumulate" (46 times), "garbage" (38 times), "photo" (36 times), "place" (23 times), "school" (23 times), "learn" (20 times), "person" (20 times), and "egg" (17 times) (Figure 2). Words are placed randomly in the figure so that the most frequent ones appear larger than the others, showing their prominence in the research analysis corpus. The word "cloud", shown in Figure 3, corroborates the results explained by the similarity analysis.

Figure 3 – Word cloud of the statements of the students participating in the research



Source: prepared by the authors

Also, related to the analysis of Figures 2 and 3 and the students' statements, we observed a concern with the reproduction of the mosquito that can transmit the disease in the school environment. Figure 4 reinforces the idea presented in the following statement:

> "I found many places with garbage. This rainy season is terrible for us at school and those living close to the school, as a mosquito can fly up to four hundred meters and infect many people." (E4)

Figure 4 – Photovoice, Images registered by the student E4

Source: prepared by the authors

According to the statements and images, several places were photographed as they are considered potential breeding sites for mosquitoes, with discarded garbage, food leftovers, dry leaves, and manholes, as recorded in Figures 5 and 6:

"[...] we have photos that show discarded garbage, dry leaves, food leftovers, organic material, and plants, which can accumulate water. There are many places where the dengue mosquito can proliferate, laying the larvae." (E20)
"We have garbage in the plants and the manhole. When it rains a lot, the manhole clogs, and the school overflows. It has happened other times. [...] I found uncapped bottles on the roof. They are dangerous as they can accumulate rainwater. Bottles, plastic, bag, rail: everything can become a potential breeding site." (E21)

Figure 5 – Photovoice, Images registered by the student E20

Source: prepared by the authors

Figure 6 – Photovoice – Images registered by student E21

Source: prepared by the authors

Photovoice was a practical and fun educational strategy, as students learned how to prevent and control mosquitoes playfully. A surprise related to the strengths of the research was some students' random photos, illustrated in Figure 7, which portray much about coexistence,

love, irreverence, and nature. The students' registered pictures transcended what had been proposed originally.

> “Making this Photovoice was an adventure. Taking pictures and showing the world that we are polluting by throwing garbage on the ground.” (E2)
>
> “I really enjoyed doing this Photovoice because we learned a lot about the dengue mosquito, and we learned how good it is to take care of our health and not leave standing water.” (E18)
>
> “I think the activity of making a Photovoice was excellent because everyone got together. We learned many things that mean a lot to our neighbors and us. They are information that we will use in our entire lives. It will help us take care of the environment.” (E19)
>
> “Making this Photovoice was wonderful. I learned about the characteristics of the dengue mosquito and discovered new places at school that I did not even know existed. I was able to alert the principal and show that changes need to be made for everyone's safety.” (E23)
>
> “With Photovoice, we learned to see the smallest details few people can see. It makes us see things differently and realize the importance of cleaning everywhere. We took repeated photos, but it’s our way of seeing the world.” (E25)
>
> “[...] I learned more things I did not know; it was great to take the pictures, and I had fun. I learned to take better care of the environment. Researching the photos was very interesting.” (E29)

Figure 7- Photovoice – Images registered by the students: E29; E19; Authors; E25; E23

Source: prepared by the authors

The students also understood the moments experienced as an opportunity for empowerment and knowledge exchange:

> “We came together to do a job that no one should do alone. We always have to come together because unity is strength.” (E8)
>
> “We really liked it because Photovoice was our activity. We had to go after it and did not have to wait for anyone. This shows that we can help the environment and show we understand it. It's our collaboration.” (E10)

Another benefit of Photovoice was to encourage participants to pay more attention to the school environment and understand how they can contribute to society:

> “We left here learning a lot, and we'll focus more and help society when we get home.” (E19)
>
> “I think we do not notice much here at school, in the rush of everyday life. So, I keep wondering: if a public school already has dengue mosquito outbreaks, imagine in the streets. If the school, supposedly a place of zeal for public authorities, has so many dengue outbreaks, imagine on the streets and in vacant lots, where people do not look or think about.” (E25)

The challenge of this study was to work on the diversity of its participants, children and adolescents, separated by their identity processes, within the multiple features of their schooling levels. Despite the challenges, the activities flowed smoothly, with adherence and integration. Unexpected potentialities arising from the study were registered; namely, the number of students who wanted to participate in the actions was higher than that proposed in the research project, as parents also expressed interest in participating in all activities. Participating students requested a ‘photographic exhibition’ at the school as a closing activity for the school year, held at the two schools in December 2018. Students also registered images of the school’s interactive spaces in which they would like to intervene, such as leaks, damaged courts or their absence, and broken playgrounds or their absence. These manifestations were directed to the schools’ administration for possible discussions.

DISCUSSION

We observed that Photovoice enhanced the role of students in coping with *Aedes aegypti* control and prevention by referring to shared responsibility, and reflection on practices was expressed through the accounts from the analyses. In some narratives, the students’ perception of community surveillance assumed timely and individual actions and involvement with community-based actions to prevent and control *Aedes aegypti* and its risk factors for transmitted diseases. We observed that some participants were surprised about daily facts that had not

caught their attention. Considering that the sustainability of a community-based program cannot be attained without the participation of individuals[12], satisfaction and respect for prevention and a supportive network were essential for accomplishing these actions.

The narratives produced by the students about the photographs translated into images of the knowledge they assimilated. The data analysis established a connection with the study's theoretical grounding topics, photos, and transcribed statements. Thus, we observed elements aligned with systemic thinking, social participation, social and gender equity, knowledge for action, transdisciplinarity, and sustainability, fundamental principles of the eco-bio-social approach[2]. Generally speaking, these processes provide society or a specific community with tools to achieve greater control and improve their health, contributing to accountability and improving public policies.

One of the backbones of the eco-bio-social approach is social participation, which considers the engagement of community representatives and all those who live in the studied reality. The participants' engagement enhanced the possibility of addressing and overcoming new challenges and sharing new knowledge. The Photovoice technique ensures that, no matter how submerged in the culture of silence, every human being can develop a critical and dialectical perspective of the world, its surroundings, and relationships[13].

One of its central ideas builds on Paulo Freire's[14] approach to critical education and is deeply rooted in anthropology, especially visual anthropology. Consolidating knowledge acquired during this study integrated the subjects involved with each other and collectively for one purpose: the health of all.

In this sense, the increased level of activities to achieve behavioral change associated with educational components and the understanding that health stems from multiple determinants aligns with articulating actions that promote health and foster collective knowledge that stimulates autonomy and emancipation individually and in the community. Photovoice's effectiveness in understanding behavior points, in particular, to its ability to capture the 'social dimension' of everyday practices[15]. Based on the analysis and discussions of the photographs, students mentioned a new, attentive perspective on the school and the events in its surroundings in their images and narratives. They also recalled the relevance of what is public. They started a discussion about care from that micro-setting (school) for the family, extending to the community from the perspective of social participation to promote public health. The eco-bio-social approach considers environmental and social education concepts and practices mosquito control coadjuvants.

The students participating in the study had the opportunity to live two experiences: the concepts discussed in the mini-course and the practical exercise provided by Photovoice. The transforming power of knowledge construction placed students at the core of the learning process

and shared their new community dialogues. Knowing that Photovoice generates knowledge production, the study attained three goals observed from the empirical data: it allowed students to register and reflect on strengths and concerns with their school community; it promoted critical dialogue and knowledge about relevant issues in discussions held in the mini-course and focus groups, and it proposed reaching out to policymakers to improve the school reality. Indeed, an image's strength is an effective tool for empowering socially marginalized population groups and allows them to represent the diversity of their experiences as a group or community members[16]. Notably, the short course taught the students about Photovoice's origin, principles, and applications.

The opportunity to work with Photovoice to align these themes with children and adolescents in a school environment awakened the essence and spirit of cooperation and integration for these actions. Its innovative proposal has strengthened the will to disseminate, implement, and continue these educational actions in other schools, which makes us believe in the possibility of conscientious citizens capable of dialoguing and educating a new generation, attentive to individual and community-based health, and respectful of the environment.

CONCLUSIONS

The study underscored the consolidation of several lines of knowledge and meanings of the practices of local players vis-à-vis social participation for the engagement of people sharing that setting. The methodological option of Photovoice showed the use of the photographic image as an element of dialogue and interrelationship between researchers and participating subjects.

The study reveals that the pedagogical activities inherent to the eco-bio-social approach in the school environment consider environmental and social education concepts and practices mosquito control coadjuvants. They positively influence thinking about health education and promotion at the individual and community levels. The participants of this research experienced both theory and practice. First, the concepts discussed in the short course and then the photographic records.

We observed the integration of various pieces of knowledge, from researchers to local social stakeholders (communities), to grasp the determinants of health for improving society. This fact allowed a better understanding of health in the combined socio-ecological systems and those of the real world, which come close to such systems. The ensuing innovations and the design of strategies to improve health and environmental conditions in a sustainable and context-appropriate manner were expanded.

Societal mobilization and sensitization through information and guidance on the prevention of these viral infections are known benefits in the setting of arboviruses. In this context, health

promotion actions through community surveillance should be a continuous and permanent exercise, consolidating the knowledge acquired during the formative educational process and integrating subjects and communities for a common purpose of health for all.

REFERENCES

1. Vairo F, Haider N, Kock R, Ntoumi F, Ippolito G, Zumla A. Chikungunya: Epidemiology, Pathogenesis, Clinical Features, Management, and Prevention. Infect Dis Clin North Am, Volume 33, Issue 4, 2019 [cited 2020 Apr 23]; Pages 1003-1025, ISSN 0891-5520, ISBN 9780323708456, https://doi.org/10.1016/j.idc.2019.08.006. Acesso em: 23 abr. 2020.
2. Charron DF. La investigación de Ecosalud en la práctica: Aplicaciones innovadoras de un enfoque ecosistémico para la salud. Madrid, España: Plaza y Valdez Editores, 2014 [cited 2018 Apr 16]. Available from: https://idrc-crdi.ca/es/libros/la-investigacion-de-ecosalud-en-la-practica-aplicaciones-innovadoras-de-un-enfoque
3. Golden T. Reframing Photovoice: Building on the Method to Develop More Equitable and Responsive Research Practices. Qual Health Res, 20(1), 2020 [cited 2021 Feb 15]; 960–972. Doi: https://doi.org/10.1177/1049732320905564
4. Wang CC, Burris MA. Photovoice: concept, methodology, and use for participatory needs assessment. Health Educ. Behavior, 1997 [cited 2018 Mar 28]; 24(3), 369-387. Doi: 10.1177/109019819702400309. PMID: 9158980
5. Touso MF. Photovoice como modo de escuta: subsídios para a promoção da equidade. Cien Saude Colet, 2017 [cited 2018 Apr 23]; 22(12), 3883-3892. https://doi.org/10.1590/1413-812320172212.25022017
6. Lima Neto AS. Um ensaio de campo randomizado por agregados para avaliação da eficácia de cortinas impregnadas com inseticida no controle do Aedes aegypti e na infecção pelo vírus dengue em crianças de Fortaleza, Brasil [Doctoral Dissertation]. Fortaleza: Universidade Estadual do Ceará, BR, 2017 [cited 2018 Nov 5]. Available from:http://siduece.uece.br/siduece/trabalhoAcademicoPublico.jsf?id=82215
7. Thiollent M. Metodologia da pesquisa-ação. 18th ed. São Paulo: Cortez, 2011.
8. De Macêdo SF, Silva KA, De Vasconcelos RB, De Sousa IV, Mesquita LPS, Barakat RDM, Fernandes HMC, Queiroz ACM, Santos GPG, Filho VCB. Scaling up of Eco-Bio-Social Strategy to Control Aedes aegypti in Highly Vulnerable Areas in Fortaleza, Brazil: A Cluster, Non-Randomized Controlled Trial Protocol. Int J Environ Res Public Health 2021 [cited 2018 Jun 22]; 18, 1278. Available from: https://doi.org/10.3390/ijerph 18031278
9. Instituto Brasileiro de Geografia e Estatística – IBGE. Panorama da cidade de Fortaleza, Ceará. 2020 [cited 2018 Jun 22]. Available from: https://cidades.ibge.gov.br/brasil/ce/fortaleza/panorama
10. Souza MA, Wall ML, Thuler AC, Lowen IM, Peres AM. The use of IRAMUTEQ software for data analysis in qualitative research. Rev Esc Enferm USP, 2018 2013 [cited 2018 May 22], 52, e03353. Available from: https://www.scielo.br/pdf/reeusp/v52/1980-220X-reeusp-52-e03353.pdf.
11. Camargo BV, Justo AM. IRAMUTEQ: um software gratuito para análise de dados textuais. Temas em psicologia, 2013 [cited 2018 May 23]; 21(2), 513-518. Available from: https://www.redalyc.org/pdf/5137/513751532016.pdf.
12. Tana S, Abeyewickreme W, Arunachalam N, Espino F, Kittayapong P, Wai KT. Investigación eco-bio-social sobre dengue en Asia: principios generales y un estudio de caso de Indonesia. In: Charron D (Ed.). La investigación de Ecosalud en la práctica: Aplicaciones innovadoras de un enfoque ecosistémico para la salud. 1st ed. Madrid, España; México D.F, México: PyV Editores, 2014 [cited 2018 Apr.16],, pp. 253-268. Available from: https://idrc-crdi.ca/es/libros/la-investigacion-de-ecosalud-en-la-practica-aplicaciones-innovadoras-de-un-enfoque.

13. Touso MF. Photovoice como modo de escuta: subsídios para a promoção da equidade. Cien Saude Colet, 2017 [cited 2018 Jul 16], 22(12), 3883-3892. Doi: https://doi.org/10.1590/1413-812320172212.25022017.

14. Wang C, Morrel-Samuels S, Hutchison P, Bell L, Pestronk R. Flint Photovoice: Community Building Among Youths, Adults, and Policymakers. Am J Public Health 2014 [Cited 2018 Mar 28]; 94(6), 911–13. Doi: 10.2105/ajph.94.6.911. PMID: 15249287; PMCID: PMC1448361

15. Bisung E, Elliott SJ, Abudho B, Karanja DM, Schuster-Wallace CJ. Using Photovoice as a Community Based Participatory Research Tool for Changing Water, Sanitation, and Hygiene Behaviours in Usoma, Kenya. BioMed Research International, 2015 [cited 2018 Mar. 29]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4561937/

16. Latz AO. Photovoice Research in Education and Beyond: A practical guide from theory to exhibition. New York: Taylor & Francis, 2017 [Cited 2018 Mar. 29]. Doi: 10.4324/9781315724089

Authorship			
Name	**Institutional affiliation**	**ORCID**	**CV Lattes**
Roberta Duarte Maia Barakat	Universidade Estadual do Ceará (UECE)	https://orcid.org/0000-0003-2305-1794	http://lattes.cnpq.br/9425015613413725
Suyanne Freire de Macêdo	Universidade Federal do Piauí (UFPI)	https://orcid.org/0000-0002-1450-8628	http://lattes.cnpq.br/6321660086583488
Thereza Maria Magalhães Moreira	Universidade Estadual do Ceará (UECE)	https://orcid.org/0000-0003-1424-0649	http://lattes.cnpq.br/2074959434257100
Virna Ribeiro Feitosa Cestari	Universidade Estadual do Ceará (UECE)	https://orcid.org/0000-0002-7955-0894	http://lattes.cnpq.br/0400411354454467
Valter Cordeiro Barbosa Filho	Universidade Estadual do Ceará (UECE)	https://orcid.org/0000-0002-4769-4068	http://lattes.cnpq.br/1816764426628735
Andrea Caprara	Universidade Estadual do Ceará (UECE)	https://orcid.org/0000-0003-1972-8205	http://lattes.cnpq.br/1140467350071168
Corresponding author	Roberta Duarte Maia Barakat robertadumaia@gmail.com		

Metadata		
Submission: February 11th, 2024	Approval: December 7th, 2024	Published: December, 12th 2024
Cite this article	Barakat RDM, Macêdo SF, Moreira TMM, Cestari VRF, Barbosa Filho VC, Caprara A. Photovoice and the Eco-Bio-Social approach with students: an Innovative strategy for Aedes aegypti control and prevention. Rev.APS [Internet]. 2024; 27 (único): e272443526. DOI: https://doi.org/10.34019/1809-8363.2024.v27.43526	

Conflict of interests	No conflicts of interest.
Funding	No funding.
Authors' contributions	Conception and/or design of the study; RDMB, AC, TMMM. Acquisition, analysis or interpretation of data RDMB, VRFC, SFM.Critical review of the preliminary version: AC, TMMM, VCBF. Manuscript writing: RDMB, VCBF. All authors approved the final version and agreed to be accountable for all aspects of the work.

Go to top