

## Recognizing territorial vulnerabilities to Zika virus: a participatory health education model

## Reconhecimento de vulnerabilidades territoriais ao vírus Zika: um modelo participativo de educação em saúde

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**ABSTRACT | INTRODUCTION:** Considering that the engagement of the population in the control of arboviruses should not be restricted to care to avoid domestic foci of the *Aedes aegypti*, health education initiatives must approach the social health determinants in the territories. **OBJECTIVE:** To describe a proposal for a pedagogical model aimed at community participation in recognizing vulnerabilities to the Zika virus and the main results of its application. **METHODS:** Based on Paulo Freire's critical-problematizing pedagogy and within the framework of vulnerability and human rights, a workshop model was developed and applied in participatory research to train community health workers to diagnose local vulnerabilities to the Zika virus in a community of Rio de Janeiro, Brazil. Four 20-hour workshops were held in weekly meetings with 38 participants. It included activities involving territory mapping, experiences with the virus, and identifying community spaces vulnerable to the proliferation of mosquitoes. **RESULTS:** The proposed pedagogical model identified territorial spaces vulnerable to the proliferation of mosquitoes that do not depend only on the will or behavior of its residents. These aspects are conditioned to social contexts that express the tense relationship between residents, the State, and drug traffickers with a vital power relationship in the territory. **CONCLUSIONS:** By transcending the traditional vertical health education model, the proposed participatory method was sensitive and timely to capture the participants' deep knowledge of the territory of residence, not only to identify mosquito foci but, above all, understanding multiple vulnerability determinations.

**KEYWORDS:** Health promotion. Community Participation. Health Education. Zika Virus. Qualitative Research.

**RESUMO | INTRODUÇÃO:** Considerando que o engajamento da população no controle das arboviroses não deveria se restringir ao cuidado dos focos domésticos de mosquitos, iniciativas de educação em saúde necessitam contemplar os determinantes sociais existentes nos territórios. **OBJETIVOS:** Descrever proposta de modelo pedagógico visando a participação da comunidade no reconhecimento de vulnerabilidades ao vírus Zika, bem como seus principais resultados. **MÉTODOS:** Baseado na pedagogia crítico-problematizadora de Paulo Freire e no quadro da vulnerabilidade e direitos humanos, foi desenvolvido e aplicado um modelo de oficina para capacitar agentes comunitários de saúde na realização de diagnóstico de vulnerabilidades locais ao vírus Zika, em uma comunidade do Rio de Janeiro, Brasil. Foram feitas 4 oficinas, de 20 horas cada, contando com 38 participantes. O modelo contemplou atividades envolvendo: mapeamento e reconhecimento do território, saberes e experiências com vírus Zika e/ou outras arboviroses a identificação de espaços na comunidade vulneráveis à proliferação de mosquitos. **RESULTADOS:** O modelo permitiu identificar pontos do território vulneráveis à proliferação de mosquitos e cuja resposta não depende apenas da vontade ou do comportamento dos seus moradores. São condicionados a contextos sociais que expressam a tensa relação entre os moradores, o Estado e os traficantes de drogas que ocupam importante espaço de poder no território. **CONCLUSÕES:** Ao transcender o tradicional modelo verticalizado de educação em saúde, o método participativo proposto mostrou-se sensível e oportuno para captar o profundo conhecimento dos participantes sobre o território, não apenas na identificação de focos de mosquitos, mas, sobretudo, na compreensão das múltiplas determinações das vulnerabilidades.

**PALAVRAS-CHAVE:** Promoção da saúde. Participação comunitária. Educação em Saúde. Vírus Zika. Pesquisa qualitativa.

## Introduction

Arboviruses have appeared and reappeared for centuries in different parts of the planet and are a relevant public health problem. The susceptibility to arboviruses is universal and can lead to consequences such as neurological problems, joint alterations, and severe hemorrhage, with high social and economic costs.

The global emergence and re-emergence of arboviruses are associated with their rapid and extensive dispersion, related to the integration of factors such as disorderly urban growth, deforestation, climate change, the air transport system, genetic mutations in viruses, and the adaptability of arthropods to new environments.<sup>1,2</sup>

Most arboviral diseases, such as dengue, chikungunya, and Zika, cannot be prevented through specific vaccines or antivirals, and there are few validated reagents for their diagnosis.<sup>3</sup> Thus, its control depends on strategies aimed at its vector through mechanical, biological, or chemical control technologies.<sup>4,5</sup>

These strategies include methods such as traditional spatial fogging (known as smoke), biological vector control, and eco-bio-social approaches, which are centered on social participation in vector control, basically through educational actions involving the population.

Spearheaded by the Special Program for Research and Training in Tropical Diseases of the World Health Organization, five Asian and five in Latin American countries, including Brazil, use the eco-bio-social approach to identify both determinants of vector creation and innovative initiatives for its control. In these initiatives, population participation is mainly focused on measures aimed at their collaboration in using methodologies that are less harmful to the environment, such as window screens with insecticides and care for domestic foci.<sup>6</sup>

While promising and with favorable results in various local contexts, the joint construction of community and territorial interventions has received little investment from Brazilian public policies to combat arboviruses. The Ministry of Health has focused its actions on chemical control and mass communication educational campaigns at the political-programmatic level.

Historically, Brazilian arbovirus prevention campaigns favor the control of domestic foci, the main responsible for the proliferation of mosquitoes due to people's inadequate behavior, such as, for example, in the packaging and disposal of garbage. Given this assumption, preventive health measures are based on information leaflets encouraging the population to care for domestic foci.

Despite the possible successes obtained with such measures, the scope of this type of initiative is questioned, in which community participation is reduced to obedience and adherence to pre-established health measures in cabinets and restricted to domestic *Aedes aegypti* foci.

Based on the criticism of verticalized pedagogical models or restricted community participation, this paper presents a pedagogical proposal based on the ideas of the Brazilian thinker Paulo Freire<sup>7-10</sup>, among which the following can be highlighted: 1) we do not "transmit" knowledge: it is the product of a joint construction that involves different knowledge and stakeholders; 2) "everyone knows", not just technicians or experts; 3) students are active participants in the knowledge process, based on their concrete experiences.

The construction of the proposal was also guided by the vulnerability and human rights framework, initially designed by Jonathan Mann and collaborators<sup>11</sup> at the beginning of the AIDS epidemic and later increased by Brazilian researchers. Besides the initial objective of guiding advocacy policies, the Brazilian approach invested in constructing new epistemological and technical bases to produce knowledge and health interventions.<sup>12</sup>

Here, the sense of vulnerability moves away from the idea of a fixed attribute of individuals or groups in favor of the dynamic and relational sense of the term, involving capabilities and resources in the interaction with social, cultural, and political contexts, and how the health services and other institutions are organized. In other words, while possible susceptibilities are pointed out, the potential of these individuals and communities to face them is also glimpsed.<sup>13</sup>

Based on these references and considering that understanding and proposing measures to mitigate the problem of arboviruses require actions in tune with the local needs of territories, this paper describes a participatory pedagogical proposal for recognizing vulnerabilities to the Zika virus (ZIKV) and the main results of its application.

## Methods

The study was based on action research<sup>14</sup>, in which participants acted collectively to identify problems and develop solutions. The research was carried out in a territory of the municipality of Rio de Janeiro, Brazil, between 2017 and 2019, during the period of confrontation with ZIKV in the country. The action itself was carried out to promote innovative prevention and health promotion practices that considered the knowledge of the community to recognize and respond to the vulnerabilities of the territory to ZIKV. Thus, it aimed to transcend the traditional campaign model, based on vertical information, with the distribution of explanatory leaflets on domestic mosquito foci.

The intervention occurred in the community called Complexo do Alemão, which comprises 14 slums, most of them with unsafe housing, water supply problems, poor sanitation, and inadequate management of solid waste and rainwater drainage. In socioeconomic terms, compared to other neighborhoods in Rio de Janeiro (RJ), it has one of the worst HDIs (0.711), one of

the highest demographic densities (286 people/Ha), and one of the worst per capita incomes (BRL 361). It is also one of the poorest neighborhoods in the city. The action involved community health workers (CHW) residing in the territory and working in a PHC unit that serves about 40,000 inhabitants. Approximately 420 ZIKV infection cases were confirmed in this territory at the time of the action. Four workshops were held with 38 participants. Each workshop had a 20-hour workload, distributed into five weekly meetings. The study was coordinated by two researchers and included two other observers, who made a dense record of the workshops, which served as the basis for the research.

A continuing education model was built following the pedagogical proposal of Paulo Freire<sup>7-10</sup>, consisting of four stages that aimed to provide reflections on the vulnerabilities of the territory to the ZIKV, given the local reality needs and potentialities. Starting from the reality of the participants and valuing their knowledge about the ZIKV and their residing and working territory, the process contextualized the ZIKV against other problems in the territory, recognizing situations that make the territory vulnerable to the proliferation of mosquitoes, and building feasible proposals to address these vulnerabilities (Table 1).

There was a concern to explore the different opinions of the participants throughout the process so that they could be explained and supported by arguments, giving rise to consensus or demarcating divergences, that is, investing in the communicative dimensions of the debates.

All procedures performed in this study were in accordance with the 1964 Declaration of Helsinki and its later amendments. This study was approved by Research Ethics Committees of the Instituto de Estudos em Saúde Coletiva da Universidade Federal do Rio de Janeiro and the Rio de Janeiro Municipality's Health Secretariat (CAAE: 81226217.8.0000.5286). Informed consent was obtained from all individual participants included in the study, prior to each workshop, and confidentiality of data was ensured throughout the process.

**Table 1.** Pedagogical model for recognizing local vulnerabilities to Zika virus (ZIKV), Rio de Janeiro/RJ, Brazil, 2017-2019

Activity step	Name of activity	Type of activity	Summary description	Objective	Explored content
1 Territory	Foreigner's visit	Group	Build a presentation about the territory, aimed at a foreigner who knows nothing about it.	Provide a reinterpretation of the territory that allows raising perceptions and trivial and non-trivial experiences of the community's daily life.	Geographic space Territory
2 Zika virus	Brainstorming	Individual Group	Freely express to the group "what comes to mind" when talking about the ZIKV.	To apprehend knowledge, perceptions, feelings, imaginaries, and controversies about the ZIKV, valuing scientific and popular knowledge.	Scientific knowledge Popular knowledge Feelings and representations
	Integrated panel	Group	Register knowledge about the ZIKV, structured in sections: "what is it", "how is it transmitted", "who is infected", "why people are infected", "how to prevent it".		
	Prevention quiz	Individual Group	Answer questions with "yes", "no" or "I have questions" and justify the answers about arbovirus prevention in general and ZIKV.	Problematize actions aimed at controlling arboviruses, differentiating the notion of space from that of mosquito outbreak.	
3 Zika in the territory	Speaking map	Group	Design the territory and identify areas of production of vulnerabilities to the ZIKV. Discuss why it occurs, when it occurs, how it occurs, who is involved.	Map potential contexts of vulnerability to ZIKV issues.	Territory residents facing identified vulnerabilities
	Group narrative	Group	"Tell a story" of a typical resident of the territory, which includes Zika in its plot. Raise matters and discuss the conditions that led the character to contract the ZIKV or protect himself from it.	Expand the partial reading about the problems related to the ZIKV, showing how residents act on them.	
4 Actions	Proposals	Group	Build feasible proposals to be implemented by the participants.	Build feasible proposals to mitigate ZIKV vulnerabilities.	Health promotion and ZIKV prevention proposals

## Results

The results were organized into four sections, according to the purposes of each stage of the proposed model. Despite the rich content and discussions provided by the workshops and the multiple possibilities for analysis, this text focused on the methodological aspects of the proposal, more specifically related to the pedagogical model developed.

### **The territory: immersion and distancing**

Regarding adult literacy, Brazilian pedagogue Paulo Freire said that “reading the world precedes reading the word”.<sup>15</sup> It is impossible to separate texts, words, or letters from the students’ perception of their world and concrete experiences. It would be unproductive to talk about the risks and the epidemiological or biomedical prescriptions for arboviruses without interpreting the reality experienced.

The possibility of immersing in the reality experienced by the participants stemmed from the anthropological perspective of its recognition through distancing, as postulated by Malinowsky<sup>16</sup>, that is, the estrangement of what is familiar. Thus, the activity’s initial slogan, “foreigner’s visit”, was to prepare an overview of the territory to a foreigner who knew nothing about, describing its main aspects.

The territory’s portrait was described similarly in the different workshops, highlighting mainly its positive qualities. The participants initially showed the “foreigner” the territory’s history, its picturesque points, such as the cable car that transported residents between the lower and upper parts of the territory, its residents’ warmth, and solidarity, taking the community as “a big family”. More than that, the participants made a point of mentioning that they were proud to live there. This positive representation of the community contrasted with that advertised by the media and found in the social imagination of a territory marked by drug trafficking and situations of daily violence.

Although the action of drug dealers, the police, and the absence of the State were very much alive in the participants’ statements during the workshop as a whole, the distancing glance at the territory, provided on the “foreigner’s visit” allowed us to transcend

the current discourse on the territory, in general, restricted to violence-related issues.

This broad perspective over the territory seemed essential as a starting point for the workshops, considering the type of pedagogical action proposed, which starts from the reality of its participants, in this case, exploring the territory beyond its geographical limits and understanding it as a live space with interactions involving stakeholders, groups, interests, different powers and, above all, the exercise of citizenship.<sup>17</sup>

### **Zika virus: building knowledge from the debate**

Three activities were carried out to raise perceptions and knowledge about ZIKV, the possible harms resulting from the infection, and ways to prevent them.

The set of actions proposed in this block of activities allowed us to recognize the coexistence of different types of knowledge about arboviruses and ZIKV, scientific and those arising from popular wisdom. Aligned with the pedagogical guideline of debate, we did not intend to define a priori or prescribe those that would be “right” or “wrong” but encourage reflection and discussion among the participants. Some widespread knowledge, such as the use of homemade repellents, and scientific “certainties” such as the use of chemical repellents, were discussed, which allowed us to identify what is known about ZIKV and what remains to be known. Scientism and its dogmatic mythification of certainty can be debated without ignoring science as a source of knowledge.<sup>9</sup> By activating epistemological curiosity among participants, we understand the controversies in the construction of knowledge and value self-experience also as knowledge.

As a result of the mosquito-centric policy for combating arboviruses and their experiences with epidemics such as dengue, the participants mastered most of the mechanical control actions, especially those aimed at guiding residents to eliminate household foci. On the other hand, some of the most updated scientific evidence about ZIKV, such as the possibility of sexual transmission of the virus, was ignored, as was found out during the integrated panel. The participants’ speeches indicated the “unspoken”, like the fact that sexual and reproductive rights issues were unknown and not debated in the actions to combat ZIKV.

However, the “Prevention Quiz” broadened the critical perspective of the different contexts influencing the proliferation of mosquitoes and the transmission of ZIKV through its other routes, such as sexual. This activity provided a dialogue between the participants’ experiences and their knowledge of the territory’s dynamics, calling into question the traditional motto of accountability and consequent individual blaming of residents for the proliferation of mosquitoes, considering that other issues concurred with this fact.

Once again, the apprehension of the territory was resumed beyond a fixed and delimited physical area to consider the territory’s historical, social, and human dynamics.<sup>16</sup>

### **Zika in the territory: from mosquito breeding sites to Zika ‘spaces’**

The activity that explored the territory, the talking map, allowed the construction of cartographic representations that mapped fixed geographic points and the community’s interactions in that territory. Potential contexts of vulnerability to ZIKV, and those that could mitigate them, were identified following the workshop’s proposal.

With the activities of the speaking map and the collective narrative, the process culminated in a diagnosis of territorial vulnerabilities to the problems of the ZIKV in tune with the local reality, highlighting in a particular way the aspects that would hardly be identified by a professional or technician not intimately familiar with the life in that place.

At the end of the workshop, territory spaces and contexts that could facilitate the proliferation of insects were identified. This expanded the participants’ perspective, which until then had been restricted to the traditional domestic mosquito foci, where prevention initiatives are primarily concentrated. We list below some of these contexts to illustrate unusual aspects the workshops unveiled.

The dynamics of drug trafficking in the territory were ambiguous, sometimes a vulnerability, sometimes a protective factor for the population concerning health issues. For example, while preventing the entry of garbage collection trucks in specific drug

business strategic locations, it violently restrained those who dumped garbage in inappropriate places, such as in front of homes. The territory’s water supply, controlled by two residents’ associations, was intermittent, forcing the population to store water in inadequate containers exposed to the proliferation of mosquitoes. Unfinished public works, with the debris of construction materials, encouraged the disposal of other waste by residents, facilitating the breeding of insects.

These are some examples that confront the traditional pedagogical focus on individual behavioral changes, as they signal other contexts, stakeholders, and bodies that make the territory vulnerable to arboviruses.<sup>18</sup> Territorial vulnerability is aligned with the dynamics of this space, including the (personal, institutional, social) resources to act against it.<sup>12,13</sup>

### **Actions: new practices as “untested feasibility”**

The thematization process enabled a critical perception of the reality in which the challenges, labeled ‘extreme situations’ from the Freirean perspective, were identified. In a dialectical perspective that sought to articulate the theory-practice, action-reflection, denunciation-announcement, and changing difficulties-changing possibilities binomials, feasible collective projects that could overcome the problems were outlined – that is, the unprecedented-feasible were projected in the face of extreme situations.<sup>9,19</sup>

In each round of the workshop, the participants in a single group or subgroups selected which problems would be addressed and, in a collective planning process, drafted proposals for projects to promote health and prevent ZIKV. A form that contained the action title, target problem, action methodology, and necessary (physical, economic, and human) resources was followed to prepare the proposal.

The perspective of the territory as a living space, the thematization of the problem that included the dynamics of social relationships in that location, and the debate on the recurrent transmission pedagogy in health education practices culminated in projects that surpassed the traditional model of actions to combat arboviruses, showing the critical and emancipatory potential of this model.

It is noteworthy that the implementation stage of the projects could not be carried out as we expected. At the same time, participants felt valued regarding including their territory perspective in planning actions (an unusual issue in their work routine) and putting these unusual actions into practice required investments that transcended their motivation and mobilization.

During the period of the workshops, the primary health unit suffered staff cuts, with the dismissal of part of the professionals, mainly the CHW, from the defunding of the public health policy, especially of the PHC services, in Rio de Janeiro and the country as a whole<sup>20,21</sup>, which triggered successive strikes, which consumed workers for political mobilizations against this setting while most of their work routines were maintained. It is worth remembering that, in this context, promotional and preventive actions are always neglected against other care and even bureaucratic activities.

## Discussion

Considering the local reality as a starting point, the set of activities proposed in the model allowed the active participation of the group in recognizing the territory's vulnerabilities, which transcended households, mosquito foci, and holding people accountable.

Traditionally, public health and, in particular, health education operates very prescriptively, indicating the actions that the population must support. The process triggered by the proposed model recognized unique spaces and issues closely linked to the territory's profile, formerly not discussed by the participants as problems related to arboviruses.

This experience was limited to a single territory in Rio de Janeiro, Brazil, and entails the reapplication of the method that, in other contexts, should recognize other territorial singularities that expose communities to the proliferation of ZIKV. It is possible to explore the specificities of each territory along similar paths, starting from a process of shared construction of knowledge, qualifying the problem, and planning solutions that respect and dialogue with local needs.

In this sense, workshop groups should include participants with a wide range of experiences and perspectives to analyze the territory's problem. While this increases the challenges for the thematization process, which may require more time than expected in the model to be carried out satisfactorily, the likelihood of being established as a community process will also be more significant.

Concerning the limitations of this proposal, it is worth emphasizing the political-programmatic context of the municipality, which is poorly aligned with the "bottom-up" methodology employed, whose primary feature considers individuals and groups as participants in the process of building the promotional or preventive health actions. Therefore, contexts with little or no porosity to more horizontal constructions may appear as barriers to implementing planned intervention projects, as identified in the last stage of the research.

Despite decentralization and community participation appearing as guiding directives for the construction of the Sistema Único de Saúde - SUS (Unified Health System), the mosquito-centered policies of the Brazilian Ministry of Health, which are part of the global health architecture, are still barriers to be confronted so that ZIKV and other arboviruses are not considered a problem to be overcome only by taking care of the domestic foci, whose questionable effectiveness has been denounced in academic literature.

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