

COOPERATION BETWEEN HEALTH PERSONNEL AND SCHOOLS FOR THE IDENTIFICATION AND CONTROL OF DENGUE

Cooperação entre agentes de endemias e escolas na identificação e controle da dengue

Cooperación entre agentes de endemias y escuelas en la identificación y control de la dengue

Original Article

ABSTRACT

Objective: To analyze the process of cooperation between health personnel and the school in potential dengue vector breeding sites in households. **Methods:** This is an exploratory and descriptive research using a quantitative and qualitative design. Data were obtained in three visits to 93 households of students from a public elementary school in Teófilo Otoni, MG. The visits were performed every 30 days through the cooperation between health personnel and researchers who identified potential *Aedes aegypti* breeding sites by using a checklist. A health education campaign was held at the school to foster debate on dengue prevention and vector control. Two visits were performed after the campaign to verify possible changes in the students' households. After that, the health personnel were questioned about their perceptions regarding the participation in the investigation process. **Results:** It could be observed, during the first visit, that 83 (89.3%) households had some kind of container suitable for the dengue vector breeding. During the second and third visits – after the health education campaign – the number of households with potential breeding sites decreased to 65 (70%) and 63 (68%) respectively, showing the important role of such campaigns in the vector control. **Conclusion:** The study shows the power of health education campaigns developed by health personnel in cooperation with elementary public schools to foster intersectoral actions for dengue prevention.

Descriptors: Dengue; Intersectorial Action; Health Education.

RESUMO

Objetivo: Analisar o processo de cooperação entre os agentes de endemia e a escola em áreas favoráveis à reprodução do vetor da dengue em domicílios. **Métodos:** A pesquisa, exploratória e descritiva, caracterizou-se por uma abordagem quantitativa e qualitativa. Os dados foram obtidos por meio de três visitas a 93 domicílios de estudantes do ensino fundamental de uma escola pública em Teófilo Otoni-MG. As visitas ocorreram com intervalos de 30 dias, por meio da cooperação entre agentes de endemias e pesquisadores orientados por uma lista de verificação para identificação de possíveis criadouros do mosquito *Aedes aegypti*. Após a primeira visita, realizou-se uma ação educativa na escola visando fomentar o debate acerca da prevenção da dengue e controle do vetor. Duas visitas posteriores foram realizadas para verificar possíveis mudanças no ambiente domiciliar. Após as visitas, entrevistas com os agentes de endemias buscaram identificar suas percepções quanto à participação no processo de investigação. **Resultados:** Na primeira visita, em 83 (89,3%) casas havia presença de algum recipiente propício à reprodução do vetor da dengue. Após o desenvolvimento de ações educativas, na segunda e terceira visitas, o número de casas com criadouros potenciais diminuiu para 65 (70,0%) e 63 (68,0%), respectivamente, indicando o potencial dessas atividades para o controle do vetor da doença. **Conclusão:** O estudo demonstra o potencial de ações educativas de cooperação entre agentes de endemia e escolas do ensino básico, viabilizando a intersectorialidade na prevenção da dengue.

Descritores: Dengue; Ação Intersetorial; Educação em Saúde.

Pablo Cordeiro da Silva⁽¹⁾
Alberto Mesaque Martins⁽²⁾
Virgínia Torres Schall⁽³⁾

1) Montes Claros State University
(Universidade Estadual de Montes Claros
– UNIMONTES)- Montes Claros-MG -
Brazil

2) School of Philosophy and Human
Sciences (Faculdade de Filosofia e Ciências
Humanas - FAFICH) - Federal University
of Minas Gerais (Universidade Federal de
Minas Gerais - UFMG) - Brazil

3) Laboratory of Education in Health and
Environment (Laboratório de Educação
em Saúde e Ambiente – LAESA) - René
Rachou Research Center - Oswaldo Cruz
Foundation (Centro de pesquisas René
Rachou - CPqRR - Fundação Oswaldo Cruz
- FIOCRUZ) - Minas Gerais - Brazil

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RESUMEN

Objetivo: Analizar el proceso de cooperación entre los agentes de endemia y la escuela en áreas favorables a la reproducción del vector de la dengue en domicilios. **Métodos:** La investigación exploratoria y descriptiva se caracterizó por un abordaje cuantitativo y cualitativo. Los datos fueron obtenidos a través de tres visitas en 93 domicilios de estudiantes de educación primaria de una escuela pública en Teófilo Otoni/MG. Las visitas ocurrieron en intervalos de 30 días por medio de la cooperación entre agentes y endemias e investigadores orientados por una lista de verificación de posibles criaderos del mosquito *Aedes aegypti*. Tras la primera visita se realizó una acción educativa en la escuela con el objetivo de proporcionar un debate sobre la prevención de la dengue y el control del vector. Dos visitas fueron realizadas después para verificar posibles cambios en el ambiente domiciliario. Después de las visitas, entrevistas con los agentes de endemias buscaron identificar sus percepciones cuanto a la participación en el proceso de investigación. **Resultados:** En la primera visita, en 83 (89,3%) de las casas había presencia de algún recipiente propicio para la reproducción del vector de dengue. Después del desarrollo de acciones educativas en la segunda y tercera visitas, el número de casas con criaderos potenciales disminuyó respectivamente para 65 (70,0%) y 63 (68,0%) indicando el potencial de estas actividades para el control del vector de la enfermedad. **Conclusión:** El estudio demuestra el potencial de acciones educativas de cooperación entre agentes de endemia y escuelas de educación primaria viabilizando la intersectorialidad en la prevención de la dengue.

Descriptor: Dengue; Acción Intersectorial; Educación en Salud.

INTRODUCTION

Although there is increasing governmental investment in planning and development of policies and programs for the control of endemic diseases, dengue still represents a major challenge for managers and workers in global public health^(1,2). In Brazil, the number of cases of this disease has increased, affecting about four million people between 2000 and 2009, resulting in hundreds of deaths⁽³⁾.

Studies point to the complexity that permeates the effectiveness of dengue control programs, particularly those actions aimed at reducing/terminating the breeding of *Aedes aegypti*, the main vector responsible for the transmission of dengue virus among humans⁽⁴⁻⁶⁾. Besides biological and entomological factors, it is necessary to consider external aspects, such as those relating to social and environmental dimensions of the health/illness process⁽⁷⁾. In this sense, factors such as the weather, the geographic and topographic setting, the rapid population growth and the uncontrolled urbanization process have been highlighted as key elements

for the strengthening of actions for vector control and reduction of cases of the disease⁽⁸⁾.

According to data from the recent *Levantamento Rápido do Índice de Infestação por Aedes aegypti - LIRAA* (Rapid Assessment of the *Aedes aegypti* Infestation Index) households are still the places of higher incidence of outbreaks of mosquito infestations⁽⁹⁾. New lifestyles, characteristic of urban centers and also incorporated by small municipalities, provide a favorable scenario for the breeding of the transmitter mosquito⁽¹⁰⁾. The increasing production of non-organic waste and the intense use of non-biodegradable materials, associated with deficiencies of public policies on urban sanitation and cleaning, highlight the need for a joint action of the State and citizens in environmental education activities that contribute to the development of preventive behaviors and attitudes⁽⁸⁾.

Studies show that the analysis of the dengue mosquito reproduction processes and the definition of actions for vector control must be guided by the understanding of the territory in which such actions will be developed⁽¹⁰⁾. Other studies draw attention to the importance of considering the representations and meanings that different people attach to dengue and vector control, enabling linkage between scientific knowledge and the community's previous knowledge, in addition to greater effectiveness of actions in health⁽¹¹⁾.

The planning based on the analysis of the local health situation has been highlighted as an important tool for situational analysis, with potential to promote critical reflection both on environmental and cultural aspects that can contribute to dengue transmission⁽⁷⁾. To these authors, it is urgent to break with decontextualized practices and consider the peculiarities and specificities of each territory.

Under this perspective, the present study aims to analyze the process of cooperation among health personnel and the school in areas that favor the breeding of the dengue vector in households. This action is part of the first stage of planning and implementation of educational measures for dengue control *in loco*, which have been reported and discussed by Silva⁽¹²⁾.

METHODS

This is a quantitative and qualitative, descriptive and exploratory research⁽¹³⁾, which sought to broaden the understanding of an endemic area where educational activities for dengue control are being planned and developed.

For this, the neighborhood of São Cristóvão was elected, located in the northern region of the city of Teófilo Otoni-MG, an area of constant notifications of the disease

in periods of higher temperatures, according to data from SinanNET⁽¹⁴⁾. The neighborhood has about 4,200 inhabitants of the lower middle class and is of high relief, which makes it difficult for the arrival of water at households. Such a situation makes it necessary to keep tanks in backyards, favoring the accumulation of water in casks, pots and other containers, mostly without adequate coverage⁽¹⁴⁾.

Based on criteria such as ease of access, managers' interest and motivation of teachers for the development of educational activities, a public school located in the studied territory was elected. The study included students enrolled in the 5th grade of elementary school, considering the orientation of *Parâmetros Curriculares Nacionais - PCN* (National Curriculum Parameters) to discuss the topic of parasitic diseases at this school stage. From the address obtained in the school registration form of students participating in the research, a territorial map containing all households included in the study has been created. At the beginning of the survey, households were visited by one of the authors of the study, along with health personnel.

At that stage, the situation of backyards was observed with the aid of a checklist created and validated by the researchers in order to identify the presence of potential breeding sites – containers, bottles, casks, etc. – for the *Aedes aegypti* mosquito. The validation of the list occurred during the pilot test, when the best way to describe certain items that were not clear yet to the health personnel was observed and information that aided the observation of aspects relevant for the research were incorporated. The study also included the use of a preventive resource for pot dishes, EvidengueTM, a mesh cover that resembles a mosquito screen, circle-shaped, made of synthetic polyester resin, with plot equal or smaller than 2 mm x 1 mm. When involving plates that collect water from flower pots, it completely seals the passage of *Aedes aegypti* to the plate, preventing oviposition, and larval hatching and development⁽¹⁵⁾. The proficiency levels of this device are described in the literature^(16,17).

The pilot test was conducted in households that were not selected for the study. In this phase, the observation checklist was validated to facilitate the training and orientation of two health personnel, research collaborators. The list covered the following aspects: record of presence of containers with larvae of *Aedes aegypti*, type and amount of potential mosquito breeding sites, use of plates to collect water in flowerpots and prior knowledge of effective measures to control the disease.

After analyzing the pilot test, the educational measures to be adopted in the school to foster debate and broaden students' knowledge about dengue prevention and vector control were defined. The educational action was based on the assumptions of meaningful learning⁽¹⁸⁾. Under

this perspective, students' prior information (gathered in interviews previously held at school) and its sociocultural context were considered for the construction of new knowledge⁽¹⁸⁾.

The educational process included the following components: adapted lecture⁽¹⁹⁾, held by the researcher himself, which consisted of an educational video entitled *AnimaDengue*⁽²⁰⁾; and distribution of EvidengueTM, a preventive tool, along with a brochure about its proficient use. All materials were based on the contextualized information, in order to promote reflection on dengue, the environment and the preventive actions available to schools. This step involved students, teachers and the research team.

After the educational activity at the school, there were two more household researches: the first, at an interval of 30 days, and the second one after 60 days, to check the status of backyards and the adoption rate of EvidengueTM, in a total of three visits per household. In the last two, the checklist was applied.

Data obtained from household research, and those related to the proficient use of EvidengueTM were analyzed by calculating the percentage. At the end, semi-structured interviews were held with the health personnel, addressing their perceptions and attitudes about participating in the process of observation of visited households, with consequent situational analysis of the territory being studied.

Participants and/or their guardians were informed about the objectives of the study and signed a Free Informed Consent Form. The project was approved by the Research Ethics Committee of the Montes Claros State University (UNIMONTES) under the number #2,304, according to the Resolution 196/96 of the National Health Council.

RESULTS AND DISCUSSION

Three visits were conducted at different times, to verify the vulnerability in the backyards of households of students participating in the study. In the first, a high number of breeding sites with potential for proliferation of the *Aedes aegypti* mosquito was found: of 93 households that were visited, 83 (89.3%) had some kind of breeding site.

There was a diversity of containers representing risk for the vector proliferation, especially drums, tarps, toys and pet bowls in 87 houses (94.0%), followed by waste in 79 (85.5%) and gutters in 28 (30.0%).

These findings reflect aspects related to contemporary lifestyles, common in the urban environment, marked by the growing production on non-organic waste, which, if incorrectly discarded, may be seen as potential breeding sites, creating difficulties for the control of the mosquito⁽⁸⁾.



Figure 1 - Unprotected plant pot in a household of the studied region.



Figure 2 - Plant pot protected with an Evidengue® cover in a household of the studied region.

Another fact observed was the presence of drums, attesting the absence of water supply. This situation reveals the indifference of public authorities in relation to basic services, such as water supply, a commodity among the rights of the residents, and a public policy inserted in the millennium development goals⁽²¹⁾. Non-compliance with such policies not only compromises the residents' health, but also extends the vulnerability of the territory for the maintenance and recrudescence of diseases that could be controlled in the 21st century⁽⁸⁾.



Figure 3 - Educational leaflet – Dengue: Know this disease to participate in its control (top: front, bottom: back).

During the second visit, the number of backyards with breeding sites decreased in relation to the first one, from 89.3% to 70.0% (68 houses). At this stage, in those 68 houses at risk, there was a decrease in containers: drums, tarps, toys, pet bowls (82-88%) and waste (61-66%).

Evidence of fewer breeding sites may be associated with the educational activities held in the school context and with the visits from the health personnel, which informed residents about the risk related to the containers observed. Similar results were found in a study⁽⁴⁾ that observed a small, but significant, decrease in the number of potential breeding sites in houses of children participating in educational interventions at school.

The big threat of the spreading of infectious diseases points to the need to restructure the epidemiological surveillance and to change control policies, aiming to bring residents into the process, for they know their local reality⁽²²⁾. Analyzing the results of an integrated effort between the *Programa Saúde da Família - ESF* (Family Health Program) and the *Programa de Controle do Dengue* (Dengue Control Program) in the city of São José do Rio Preto, the authors point out that, in the areas where those

personnel have acted, there were significant changes in terms of gains of knowledge and reduction of containers⁽²³⁾.

It was also observed during the second visit the level of adherence to the use of the new preventive resource for flowerpot plates, Evidengue™, of which copies were distributed to 81 research participants. In this verification, only eight plates of flowerpots were found, in five houses. Of these pots, six (85.0%) were sealed with the Evidengue™ cover. Moreover, the proficiency level regarding the use of the cover was observed and it was found that five of these pots (83.3%) showed proficiency level 3 (full sealing) and one pot, proficiency level 2. Previous studies in public schools in endemic regions of Belo Horizonte-MG demonstrated the adoption of Evidengue™ in 65.9% of households of students where there were plant pots with water collector plates, with low proficiency only between 5% and 10% of the three groups receiving the covers^(16,19). Assessment of proficiency levels associated with different means of information also shows that videos and brochures enhance the proper use of the cover by the schoolchildren⁽¹⁷⁾.

In the third domiciliary visit, a slight decrease in the number of households with breeding sites was observed in relation to the second visit. Of the 93 houses visited, breeding sites were found in 63 (68.0%) - only 5 less than in the previous stage. Educational activities held in schools may have awakened part of the students regarding their responsibility in dengue control, but they were not sufficiently sustained over time. It is thus appointed the short duration of the educational process, which requires continuity and a more interactive and participatory approach, involving the sectors of education and health.

There was a small number of water collecting plates in flowerpots (Figure 1), unlike other municipalities, among them, Belo Horizonte, as recorded by Barros⁽¹⁹⁾. During the third visit, seven pots with water collecting plates were found, in only four of the 93 residences. Of these, only four (57.1%) were sealed with the Evidengue™ cover (Figure 2). As for the proficiency level, two pots were level 3, and two were level 2. A decrease in adoption and proficiency was then observed, revealing that the stimulated preventive actions were not maintained.

Investments in health education practices are needed, but they require continuous processes. The action developed here was timely and mobilized some students, indicating its potential. However, it also indicates that it needs to be mediated and reinforced by other intersectorial actions. Vector control and collection of intervention proposals must involve all segments related to the problem: community, workers, health professionals and educators of the region, as well as political representatives. The participation of all should be encouraged by promoting and mobilizing the

various actors in the prevention and control of dengue.

After the stage of house visits, two health visitors (HV) of the region participating in the study and in the proposed educational intervention were interviewed. They positively evaluated the educational strategy and highlighted its potential for the development of prevention, combat and control of dengue.

"It was very good! A new experience! A new measure to fight against dengue!" (HV1)

"This experience was really meaningful." (HV2)

For them, the educational action pointed to the necessity of a more detailed observation of other vector focuses, specially the monitoring of backyards with plant pots.

"Not all health professionals are careful enough to be alert to that (...) Sometimes, they go there, have a quick look and do nothing!" (HV1)

"It [checklist and previous training] helped me to be alert to plant pots (...) I am more alert to this kind of plant pot and to the little plate." (HV2)

One of the agents pointed to the importance of student participation in the development of an educational strategy, in order to act as multipliers of the knowledge learned in school and contribute to the construction of preventive actions in daily family life.

Studies point to the potential of participatory methodologies in changing beliefs, attitudes and behaviors in face of health problems, favoring the autonomy of individuals⁽²²⁻²⁴⁾. This is highlighted by the health professionals, as indicated by the following testimony.

"I thought that the participation of students was something very good. There are houses that we visit now, and students are being more careful with their houses, giving orientations. Mothers say: 'my kids are being careful, always remembering something'." (HV1)

The implementation of an educational action under the intersectorial perspective (integrating the education and health sectors) was pointed as a crucial element, enhancing results related to vector control in the municipality.

"The project helped because there are houses where we would pass within two months, and many focuses were eliminated during work visits (...) Inspections have hastened a lot the service. Focuses to which we would arrive within two months, we managed to eliminate with a well done inspection, with the verification (...) Many focuses were avoided, previously eliminated, through this work!" (HV1)

In addition, a change in the attitude of the health personnel participating in the project was observed, thus retrieving the dialogical dimension of the endemic disease agent, breaking with the vigilant and transmissionist perspective. As mentioned, with the visits and the use of a script (checklist), they started to pay closer attention to a variety of containers that represented risk of vector reproduction, and to exercise the utmost vigilance to points as water tanks coverage, conditions of gutters and drums. The activity became less mechanical, and communication with residents was enhanced. This resulted in fewer containers on subsequent visits, although a continuous effort is still needed, so that the risk is reduced in its entirety. What is clear from this experience is the alert to the need for continuing training of personnel, a process that goes beyond theory and includes practices such as those developed in this study.

"Before, it was mechanical. I arrived and asked to the person if the plates were being cleaned. And then it would avoid the dengue focus. Now it is different. Now, in addition to giving orientation to the person, I am more alert." (HV2)

Regarding Evidengue™, health professionals evaluated it as a simple and promising technology for dengue control in the municipality. Given the difficulty of adherence of the population to use sand on the plant plates, Evidengue™ was identified as a new alternative, which, in addition to controlling the vector, facilitates the work of health professionals.

"I think that the city administrators should participate. Not only the local government, but the whole country. (...) It protects a lot. It avoids that the mosquito procreates in these focuses." (HV2)

"It would be something good (the use of Evidengue™). It would be one less preoccupation for us, instead of having to insist with the person to put sand." (HV1)

It is noteworthy that, although in the original design of the survey there was also intention to assess the Evidengue™ cover, this goal is no longer relevant in the studied region, because the type of target container (plate to collect water in plant pots) was not present in most of the surveyed households. However, in the few houses that had plant pots, the protective cover was adopted and with a good level of proficiency in the second visit, although it has not been maintained, which may be due to the short period of the actions.

The inclusion of Evidengue™ cover in the study is based on the assumption that the student, sensitized at the school to control dengue, would transform their new

knowledge into action, taking home a concrete preventive action and motivating residents to adopt it, promoting greater protection regarding one of the multiple kinds of vector breeding site. It is also believed that this technology, accompanied by a brochure, could draw attention of the student's family to the importance of maintaining a safe residence, eliminating or reducing other focuses that would be suitable for the vector.

Although this aspect has not been sufficiently studied, due to the characteristics of the neighborhood selected for the study, the investigation in households of 93 students allowed us to get to know the territorial reality of the focus endemic region, drawing attention to the risk of dengue transmission and the identification of containers associated to such vulnerability. An evidence was the presence of numerous larvae of the vector in drums, containers associated with lack of water supply in the region and very common in backyards.

Thus, evidences of poor knowledge by the students and the vulnerability of those backyards disclosure the urgency of measures to protect and repair such conditions, requiring greater accountability of the local government and community participation.

From the results obtained, an educational brochure⁽¹²⁾ (Figure 3) was prepared, with an interactive approach, seeking to motivate students to develop activities that could be performed at home. It provides clear information on the disease symptoms, the cycle of the vector and includes illustrations respectful to the use of scale by avoiding distorted caricatures of the mosquito, aiming their identification and control. What stands out in the brochure⁽¹²⁾ is its suitability to the local conditions and the contextualized representation of the household, motivating the individual and collective responsibility in controlling the disease. It also informs phone numbers and local addresses for clarification of doubts, suggestions and criticisms.

FINAL CONSIDERATIONS

This study enabled us to broaden the understanding of the territorial situation of students' households in an endemic area of Minas Gerais as for the risk of dengue transmission. It also allowed us to examine the potential for cooperation between schools and health services, and to improve the daily work of health personnel for better disease control.

Another noteworthy finding in this study refers to the participation of health personnel as collaborators in assessing backyards, revealing that they are important partners for the development of intersectorial activities implemented in the context of Primary Healthcare.

In this sense, it is clear that education associated with dengue prevention should be undertaken in a participatory and continuous way, and not only in epidemic periods. Under such an approach, it is believed that the number of notifications and cases may decrease in the municipalities, improving the quality of life and health of the population.

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Mailing address:

Pablo Cordeiro da Silva
R. Conselheiro Mayrinck, 164 - Altino Barbosa
CEP: 39800-063 - Teófilo Otoni - MG - Brazil
Email: pablo_cordeiro@hotmail.com