

HOUSEWIVES' KNOWLEDGE ABOUT DENGUE IN AN ENDEMIC AREA OF THE STATE OF MARANHÃO, BRAZIL

CONHECIMENTO DAS DONAS DE CASA SOBRE DENGUE EM UMA ÁREA ENDÊMICA DO ESTADO DO MARANHÃO, BRASIL

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Abstract

Introduction: Dengue remains one of the major diseases of public health importance in tropical and subtropical countries. Is the target of concern in parts of government and society in general, since the most vulnerable link in the control is combating main vector *Aedes aegypti*. **Objectives:** To determine the level of knowledge and information of housewives about the prevention and control of dengue. **Methods:** The study is a sample survey (200 interviews) carried out in August through October 2007, in four neighborhoods of the western portion of the municipality of Caxias, State of Maranhão, Brazil, a locality with records of high densities of *Aedes aegypti* larvae and numbers of cases of dengue fever. A closed questionnaire was used to evaluate the level of knowledge of local housewives about the disease, its vector, and its prevention. **Results:** The women surveyed had a satisfactory level of information regarding dengue, *i. e.*, more than 80% were able to correctly describe the transmission of the disease, and to recognize the importance of containers filled with stagnant water for proliferation of *A. aegypti*. However, 97% reported having water-storage containers in their homes. These data emphasize the dissociation between knowledge and practice regarding dengue. Therefore, educational campaigns are necessary to effect further changes in population behavior; because the residents do not follow the necessary practices to prevent the vector from proliferating, and maintain mosquito breeding sites in their homes. **Conclusion:** This survey provides supporting information to help in the development of new educational efforts to improve the participation of housewives in dengue control.

Keywords: *Aedes aegypti*. dengue. women.

Resumo

Introdução: A dengue continua sendo uma das principais doenças de importância em Saúde Pública nos países tropicais e subtropicais. Constitui-se alvo de preocupação por parte do poder público e da sociedade em geral, uma vez que o elo mais vulnerável para o controle é o combate ao principal vetor, o *Aedes aegypti*. **Objetivo:** Verificar o conhecimento e o nível de informações das donas-de-casa sobre a prevenção e controle da dengue. **Método:** Trata-se de um inquérito amostral (200 entrevistas), realizado entre agosto e outubro de 2007, em Caxias (MA), em quatro bairros da zona oeste, localidade com registro de alta densidade de imaturos e do mosquito *Aedes aegypti*. Avaliou-se por meio da aplicação de questionário fechado, o conhecimento das donas-de-casa sobre a dengue, seu vetor e prevenção. **Resultados:** Mostraram que as entrevistadas possuem um nível satisfatório de informação sobre a dengue, ou seja, mais de 80% dos entrevistados souberam relatar de forma correta a transmissão da doença, bem como reconheceram a importância dos recipientes contendo água parada para a proliferação do *A. aegypti*. Contudo, 97,0% dos entrevistados relataram possuir recipientes de armazenamento de água no interior de suas residências. Esses dados evidenciam a dissociação entre o conhecimento e práticas sobre a doença. As campanhas educativas são necessárias como medidas para fortalecer as mudanças de comportamento da população, pois apesar do conhecimento sobre a dengue, os moradores não praticam as ações necessárias para evitar a proliferação do vetor, mantendo criadouros nas residências. **Conclusão:** A pesquisa pode servir como subsídio para orientar novas ações educativas voltadas para maior participação das donas-de-casa nas ações de controle da dengue.

Palavras-chave: *Aedes aegypti*. Dengue. Mulheres.

Introduction

Dengue fever remains a disease of public-health importance in tropical and subtropical countries. In Brazil, dengue is a matter of concern for the government and civil society in general, because of its high incidence throughout the country. Control measures emphasize combat of the main vector, the mosquito *A. aegypti*, since neither vaccines nor a specific treatment for this disease exist at present¹.

Consequently, interventions mainly focus on the reduction of *A. aegypti* populations by means of chemical control, and on community-education campaigns. However, the strategies used to combat the

vector have not yielded the expected results. Populations of *A. aegypti* remain high, and successive dengue epidemics continue to occur in many parts of Brazil².

Information campaigns using television networks, newspapers, posters, radio programs, and community lectures seeking the cooperation of the population for the elimination of mosquito outbreaks have shown limited effectiveness. Many studies in Latin America and Thailand show a similar trend: the population was well informed about dengue and the means of prevention³⁻⁶, but the control of mosquito-breeding sites in homes remained unsatisfactory⁷.

The community assumes that combating *A. aegypti* is an exclusive responsibility of the public agen-

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cies, while health professionals recognize the need to mobilize the community to plan joint actions, in order to achieve effective control⁸. Therefore, the greater the combined effort of the community and governmental agencies, the greater is the possibility of making the population aware of the importance of vector-control measures, and of increasing the chances of reducing the number of dengue cases. Only with the participation of the population, through preventive practices that are closely related to patterns of living and housing in urban areas, will it be possible to achieve satisfactory control of the disease⁵.

Therefore, more-effective actions are needed to change community habits, in order to motivate effective practices that contribute to reducing the incidence of the vector in the domestic environment⁴.

Regardless of social class, most housekeeping is normally the responsibility of women. Accordingly, it is essential to direct public-health educational campaigns toward housewives, inspiring them to combat *A. aegypti* and its breeding sites. Hence, it is important for women to take part in actions regarding health issues, in particular the control of endemic dengue⁹.

The state of Maranhão faces a situation of low socio-economic conditions. The municipalities in the hinterlands of the state are in the worst case, with serious deficiencies in basic sanitation, favoring vector proliferation. The low educational level of most of the population also hampers efforts to prevent dengue¹⁰.

Therefore, a study was conducted in neighborhoods where dengue is endemic, in the municipality of Caxias, one of the five largest cities in Maranhão. The study aimed to assess housewives' knowledge and information level regarding the transmission, prevention and control of dengue, in order to contribute to the planning of disease-control initiatives in the state.

Methods

Study area

The municipality of Caxias is located in the eastern part of Maranhão (4°51'32"S; 43°21'2"W), with a mean altitude of 67 m above sea level and an area of 5,313.2 km². The climate is typically tropical, with a mean annual temperature of 28.39°C and mean annual precipitation of 1,454.6 mm, and two distinct seasons: a rainy period from January to June, and a drier one from July to December¹¹. According to the Brazilian Institute of Geography and Statistics - IBGE, the population of Caxias in 2002 was 144,387, with a demographic density of 25 inhab km² and an annual growth rate of 1.06%¹².

For this epidemiological survey, four neighborhoods in the western portion of the municipality were selected at random. These neighborhoods, Fazendinha, Salobro, Pirajá and Caldeirões, had the highest indices of *A. aegypti* immatures and records of dengue cases, according to information from the Endemic Disease Control Program of Caxias, Maranhão (Programa de Controle de Endemias de Caxias, Maranhão).

The neighborhoods in the western part of the municipality have a low socioeconomic level. Most houses are constructed of bricks, but the streets are unpaved. Sanitation conditions are poor, mainly with respect to the public water supply, which is quite irregular.

For the epidemiological survey, four neighborhoods in the region were selected at random. The neighborhoods have odorous open sewers, affording sites for mosquito proliferation. The majority of these neighborhoods contain abandoned building sites where trash is discarded. Garbage also accumulates in the backyards of dwellings.

Sampling

The study was carried out in a total of 200 randomly selected buildings, in four of the neighborhoods. The sample size was defined based on the sample calculation, considering the universe of 2381 residences and taking into account a tolerable sampling error of 10%¹³.

Data collection

Data were collected by means of a survey, which was tested previously in nine other neighborhoods of the municipality, in order to confirm the accuracy of the questionnaire and the quality of the information obtained. A dwelling was considered to be the sampling unit, and the person (at least 18 years of age) in charge of it was interviewed. If a selected dwelling was closed, it was replaced by the dwelling next door. Monitoring was carried out for 5% of the dwellings surveyed, in order to check the information obtained. After all required corrections and adjustments were completed, the final version of the questionnaire was used for the survey.

The questionnaire consisted of 10 questions addressing dengue, the *A. aegypti* mosquito, ways to prevent mosquito proliferation, and ways to obtain information about the disease. Some questions had several possible answers, but only one of them was correct, *i.e.*:

How to exclude the dengue mosquito?

- By eliminating containers that may serve as breeding sites for the vector.

What is Temephos used for?

- To eliminate immature forms of *A. aegypti*.

How is dengue transmitted?

- By the bite of *A. aegypti* females infected with one of the serotypes of the disease.

What does the dengue mosquito look like?

- Dark body covered with white spots.

Where does the dengue mosquito breed?

- In water.

On the other hand, some questions had no "correct" answers, such as:

How did you obtain information about dengue?.

Which campaign against dengue is easiest for you to understand?.

How well do you understand the campaigns against dengue?.

Which factor mostly prevents you from understanding campaigns against dengue?.

Do you think that the campaigns against dengue should be focused specifically toward housewives?

Does the endemic-disease control agent visit your home?

How frequently does the endemic-disease control agent visit your home?

Is the water supply sometimes interrupted in your neighborhood?, and

What kind of container that can serve as a mosquito breeding site is most common in your home?.

The study was approved by the Research Ethics Committee of Presidente Dutra University Hospital ("Comitê de Ética em Pesquisa do Hospital Universitário Presidente Dutra da Universidade Federal do Maranhão"), protocol number 33104-1277/2007. Each housewife interviewed signed the free and informed consent form.

Data analysis

Data analyses were performed using the software Systat® version 10.2¹⁴. Contingency tables were used to evaluate the association between each dependent variable (responses about knowledge regarding dengue, the vector, and preventive measures) and the independent variable (neighborhood). Pearson's Chi-square association test (χ^2) was performed to evaluate the significance of the relationship between variables. For all analyses, a probability of 0.05 was used as the critical significance level.

Results

Of the 200 housewives surveyed, 56% were more than 40 years old ($\chi^2 = 0.487$; $df = 3$; $p = 0.922$) and 54% had completed elementary school ($\chi^2 = 1.127$; $df = 3$; $p = 0.771$). Regarding family incomes, 52% said they earned up to one Brazilian minimum wage (R\$ 545.00, which corresponds to US\$343.37) ($\chi^2 = 4.327$; $df = 3$; $p = 0.228$).

Table 1 presents the results for the housewives' knowledge about *A. aegypti*. When asked about ways to exclude the dengue mosquito, 57.5% of the interviewees ($\chi^2 = 1.698$; $df = 3$; $p = 0.637$) answered the question correctly. With respect to the use of Temephos in water-storage containers, 83.0% of the interviewees said that it is a preventive measure against *A. aegypti* larvae ($\chi^2 = 2.977$; $df = 3$; $p = 0.395$). Responses about dengue transmission differed significantly among the neighborhoods. Most, 85.5% ($\chi^2 = 10.446$; $df = 3$; $p = 0.015$) of the housewives correctly answered that dengue is transmitted by the bite of *A. aegypti* females infected with one of the serotypes of the disease. On the other hand, concerning the characteristics of the vector, only 38.5% ($\chi^2 = 6.821$; $df = 3$; $p = 0.078$) of the interviewees stated that the mosquito has

Table 1 - Frequency of responses to questions about the dengue mosquito, municipality of Caxias, State of Maranhão, Brazil, 2007.

Questions	Correct Responses		Incorrect Responses		χ^2	df	p
	n	%	n	%			
How to prevent mosquito infestations	115	57.5	85	42.5	1.698	3	0.637
Utility of Temephos	166	83.0	34	17.0	2.977	3	0.395
Dengue transmission	171	85.5	29	14.5	10.446	3	0.015
Mosquito characteristics	77	38.5	123	61.5	6.821	3	0.078
Mosquito breeding sites	179	89.5	21	10.5	4.416	3	0.220

Table 2 - Frequency of housewives' answers about dengue campaigns, according to the neighborhood, municipality of Caxias, State of Maranhão, Brazil, 2007.

Questions	Responses				χ^2	df	p		
	n	%	n	%					
Ways of obtaining information	Means of communication	138	69.0	Others	62	31.0	4.956	3	0.175
Campaign easiest to understand	Health agent	97	48.5	Others	103	51.5	10.630	3	0.014
Level of clarity of campaigns	Good	112	56.0	Others	88	44.0	1.461	3	0.691
What mostly impedes the understanding of campaigns	Explanations about the vector	70	35.0	Other reasons	130	65.0	4.484	3	0.214
Campaigns focused toward housewives	Yes	143	71.5	No	57	28.5	43.455	3	<0.001

Table 3 - Frequency of housewives' responses about the visits of endemic-disease control agents, water supply, and presence of containers within the buildings, municipality of Caxias, State of Maranhão, Brazil, 2007.

Questions	Responses				χ^2	df	p		
	n	%	n	%					
Visits of endemic-disease control agent	Yes	174	87.0	No	26	13.0	15.031	3	0.002
Frequency of visits of endemic-disease control agents	Monthly	157	78.5	Others	43	21.5	27.107	3	<0.001
Interruptions in water supply	Yes	111	55.5	No	89	44.5	59.500	3	<0.001
Most numerous containers in building	Storage	194	97.0	Others	6	3.0	3.436	3	0.329

a dark body with spots. To the question "Where does the dengue mosquito breed?" the correct place (water) was given by 89.5% ($\chi^2 = 4.416$; $df = 3$; $p = 0.220$) of the housewives.

With respect to the means of obtaining information, the media (television, radio and newspapers) were cited as the main source of knowledge by 69.0% of the interviewees ($\chi^2 = 4.956$; $df = 3$; $p = 0.175$). However, opinions about the best source of clarification were divided: 48.5% ($\chi^2 = 10.630$; $df = 3$; $p = 0.014$) of the

housewives stated that the endemic-disease control agents are the best source of information about the disease and its vector, while 51.5% named one of the other sources (media, educational campaigns, speeches, posters and pamphlets). The responses showed that campaigns against dengue are effective in conveying information, according to the opinion of 56.0% ($\chi^2 = 10.630$; $df = 3$; $p = 0.014$) of the housewives interviewed. Of this number, a total of 35.0% ($\chi^2 = 4.484$; $df = 3$; $p = 0.214$) also indicated that the lack of explanation concerning the vector is the major impediment to better understanding of the campaigns. A significant number of responses, 71.5% ($\chi^2 = 43.455$; $df = 3$; $p < 0.001$) indicated that campaigns against dengue should be focused specifically toward housewives (Table 2).

When questioned about visits by endemic-disease control agents, 87.0% of the women confirmed that they occur ($\chi^2 = 15.031$; $df = 3$; $p = 0.002$). Regarding the frequency of these visits, 78.5% ($\chi^2 = 27.107$; $df = 3$; $p < 0.001$) stated that visits are made monthly. With respect to interruptions in the water supply, the majority of the housewives, 55.5% ($\chi^2 = 59.500$; $df = 3$; $p < 0.001$) confirmed the problem. To the question "What kind of container that can serve as a mosquito breeding site is most common in your home?" 97.0% of the interviewees ($\chi^2 = 3.436$; $df = 3$; $p = 0.329$) mentioned storage containers (tanks, buckets, vats and barrels), observing that this was the most frequent breeding site in all the neighborhoods studied (Table 3).

Discussion

Dengue control has proved to be a complicated exercise. Although it was first recorded in Brazil in the 1980s, new cases of the disease occur each year throughout the country. The major reason for this failure is the multidisciplinary character of control measures, including vector control, diagnosis of affected persons, and also the difficult task of making the population aware of the need for them to participate in combating the vector. This last aspect has been identified as a key element in disease-control programs. Since the vector breeds in water-filled containers in residences, participation by residents is the only way to have a greater impact on reducing the vector population. Consequently, housewives are the most important link between the transmitted information and the practice of dengue control⁹.

In this study in Caxias, the survey showed that housewives in these four neighborhoods still have only limited knowledge about dengue and, mainly, about its vector *A. aegypti*. Many housewives were unaware of certain basic aspects of the disease. For example, when asked about the proper way to prevent the vector *A. aegypti* from breeding, less than the half of the women answered this question correctly. In view of this gap, and considering that this is basic information for vector control, it is essential to improve the level of knowledge about the disease.

The low level of knowledge about dengue in Caxias was also observed, in a study carried out with public-school students¹⁵. These authors reported a low

percentage of correct answers to the question "How is dengue transmitted?", indicating that the general population still has minimal knowledge about dengue.

A positive result observed here was that the housewives recognized the importance of containers filled with stagnant water for *A. aegypti* reproduction; *i.e.*, they reported that these containers may serve as mosquito-breeding sites.

These results are reflective of the ease with which information on dengue can be acquired, through the media, educational campaigns, speeches, posters and other means. These campaigns are used to emphasize issues regarding breeding sites, conveying information such as "Do not leave a container filled with stagnant water", where the significance of domestic containers for mosquito dispersal is stressed^{7,16,17}.

Notably, the housewives in Pirajá gave different answers than those in the other neighborhoods to the question "How is dengue transmitted?" other authors, on work done in neighborhoods located in the same area this article, also found differences among neighborhoods in Caxias, which reflect the type of housing and other basic sanitation conditions¹⁵. In areas where these conditions were better, the residents showed more knowledge of dengue. The socioeconomic variables related to the occurrence of dengue are discussed in many studies^{10,18}. However, each municipality, and even each neighborhood, has its own situation and daily problems, which must be studied locally in order to plan the appropriate mosquito-control strategies.

The housewives showed little knowledge of the morphological characteristics of the dengue vector. This information was reported to be one of the main difficulties in the campaign, as well as the foremost barrier to education about the disease. Therefore, it is necessary to provide better descriptions of the vector, in future campaigns, as well as by the endemic-disease control agents, who are the main transmitters of information to the general public.

In a qualitative approach, it is found that people often conceive ideas that are at variance with scientific fact. The author mentioned the example of *A. aegypti*, since public-health agents may transmit to people an idea of a mosquito that is quite different from the actuality¹⁷. Other studies mentioned one possible solution to this problem: the activity of public-health workers could be complemented by the use of displays where residents could observe the complete life cycle of the vector, using eggs, larvae, pupae and adult forms of *A. aegypti*³. The results of this study reveal the need to train endemic-disease control agents, in order to better clarify morphological features of vectors or to improve their explanations about the insects.

With respect to obtaining information regarding dengue, the media (television, radio, newspapers) were mentioned as the main source of knowledge, similarly to the results of other investigators¹⁵. Usually the television and radio, which reach most of the population, could play an essential role in health campaigns, through the possibility of supporting programs with an interactive approach. Television and radio programs could continuously disseminate more complete information and create a space for discussion among listeners. However, the media prioritize

dengue only during epidemics, and the disease is forgotten when the number of cases decreases¹⁹.

The work of endemic-disease control agents was widely recognized by the housewives, who considered that the information that they convey is the best way to learn about dengue. Previous studies have shown the importance of endemic-disease control agents as transmitters of information, and good acceptance of their work by a large part of the public¹⁵. These agents are a fundamental link between the general public and the public-health service, as both are part of the community routine. However, these professionals often limit their activities to merely inspecting breeding sites. This is probably a result of lack of time, or also the need to accomplish their main responsibility of eliminating breeding sites in dwellings^{19,20}.

The maintenance of dengue as an endemic disease involves social and infrastructure factors, reflecting the conditions of residents' lives. The irregular public water supply is an issue that directly affects the control of the dengue mosquito²¹. Most of the housewives interviewed for this study reported interruptions in their water supply. In households with less purchasing power and where the water supply is intermittent, the use of containers, *i. e.* water tanks, barrels, buckets, pots, and others, provides suitable environmental conditions for a larger number of potential breeding sites for *A. aegypti*²². Several studies have shown the contribution of storage containers to the dispersal of *A. aegypti*⁸.

A markedly high proportion of women agreed that campaigns should be more focused on them, as they have the greatest responsibility for housecleaning in nuclear families²³. The current picture of the occurrence of dengue in Brazil requires, among other aspects, initiatives to motivate and involve housewives,

who are the primary persons caring for dwellings, where all stages of the life cycle of *A. aegypti* occur.

The effectiveness of dengue control relies on many complex factors, including improvement in basic sanitation conditions, especially the water supply in poor areas. It is also necessary to improve educational and health-awareness programs in order to keep people motivated to combat *A. aegypti*²⁴, and to work with various segments of the population, including women and children. In order to achieve this result, new forms of language in educational activities, greater involvement of the general public in the elimination of breeding sites, and effective changes in domestic habits demand creativity and flexibility from the professionals responsible for control programs sponsored by the various public-health entities¹⁵. Therefore, this study can serve as a basis for the improvement of mosquito-control actions in the municipality; it showed that women are aware of their role in vector control, and may act as voluntary agents in dengue-control programs that involve housewives and demonstrate the importance of their actions in their own homes and in the community, and the impact of these actions in effectively reducing dengue cases.

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