



Knowledge and attitudes on the control of *Aedes aegypti* in Quilombolas communities of Sergipe

*Conhecimentos e atitudes sobre o controle do *Aedes aegypti* em comunidades Quilombolas de Sergipe*

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ABSTRACT

The objective was to evaluate knowledge and attitudes about the control of *Aedes aegypti* of quilombolas in the state of Sergipe according to socioeconomic, sanitary and environmental conditions. Quantitative cross-sectional study with 389 quilombolas, proportionally distributed in 15 communities. Quilombolas reported having internet access (78.9%), mobile phones (84.4%) and running water ($p < 0.0001$). The attitudes of cleaning the gutter ($p = 0.014$), the water tank ($p < 0.0001$) and the care required with yard debris ($p = 0.045$) are adequate. Knowledge about vector control (58.1%) and which arboviruses are transmitted by it (69.2%) were adequate, 60.8% said they had knowledge about vector proliferation and, therefore, perform attitudes to combat it. It is concluded that the quilombolas had adequate knowledge and perform attitudes that can lead to vector control. However, it is necessary to incorporate continuous educational measures for the permanence of these good practices.

Keywords: *Aedes aegypti*. Attitude. Knowledge African continental ancestry group. Health of specific groups.

RESUMO

O objetivo deste estudo foi avaliar conhecimentos e atitudes sobre o controle do *Aedes aegypti* dos quilombolas no Estado de Sergipe de acordo com as condições socioeconômicas, sanitárias e ambientais. Trata-se de estudo transversal quantitativo com 389 quilombolas, distribuídos proporcionalmente em 15 comunidades. Os quilombolas referiram ter acesso à Internet (78,9%), ao celular (84,4%) e possuíam água encanada ($p < 0,0001$). As atitudes de limpeza da calha ($p = 0,014$), da caixa d'água ($p < 0,0001$) e cuidados necessários com o entulho no quintal ($p = 0,045$) estão adequadas. Os conhecimentos sobre o controle do vetor (58,1%) e quais arboviroses são transmitidas por ele (69,2%) estavam adequados, 60,8% afirmaram possuírem conhecimentos sobre a proliferação do vetor e, portanto, executam atitudes para combatê-lo. Conclui-se que os quilombolas possuíam conhecimentos adequados e executam atitudes que podem levar ao controle do vetor, mesmo assim é necessária a incorporação de medidas educativas de caráter contínuo para a permanência dessas boas práticas.

Palavras-chave: *Aedes aegypti*. Atitude. Conhecimento. Grupo com ancestrais do continente africano. Saúde de grupos específicos.

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INTRODUCTION

The quilombola population is made up of descendants of black slave individuals, whose essence is the territory and strong kinship, keeping cultural and religious traditions alive. Quilombola communities are territories inhabited by individuals who gather bonds of coexistence and collectivity and take the land as the center of their struggles, resistance and diversity, due to the social exclusion faced by this population¹.

Quilombolas, as they are usually called, have an invaluable historical and cultural heritage. In Brazil there are 2,667 quilombola communities registered throughout the national territory, and the State of Sergipe has 35 communities certified by Fundação Cultural Palmares. The members of these communities are involved in rural or cultural subsistence works, extractivism or artisanal fishing².

Throughout history, countless social achievements have been accomplished by quilombolas through the creation of specific public policies for their reality. Advances in the certification and regulation of land areas, infrastructure of health and education services, support for local development aimed at environmental, social and economic sustainability and the realization of the right to citizenship can be highlighted. These actions help quilombolas to overcome their social invisibility process, thus promoting the diffusion of their socio-cultural diversity²⁻⁵.

However, in Brazil 74.73% of quilombola families are in extreme poverty, 24.81% cannot read and 79.78% depend on social assistance from the federal government. Regarding the infrastructure of the communities, most of them have unpaved floors, they do not have basic sanitation and adequate garbage collection, nor a bathroom or toilet³.

The concept of health reflects the social, economic, political and cultural conjuncture, therefore, it is necessary to establish a relationship between the Social Determinants of Health (DSS) and

the health situation of the populations. According to the National Commission on Social Determinants of Health (CNDSS “the social, economic, cultural, ethnic/racial, psychological and behavioral factors that influence the occurrence of health problems and their risk factors in the population”); thus, the social vulnerability in which this quilombola population is inserted has a direct relationship in their health-disease process⁶.

Morbimortality, both from infecto-contagious origin and from chronic-degenerative diseases, is a reflection of the socio-environmental causalities in which this population is inserted⁷⁻⁹. Diseases caused by arboviruses are inserted in this context, since the precarious conditions of health infrastructure and demographic explosion are emerging as important requirements for the proliferation of the vector and consequently the transmission of the disease^{10,4}.

In Brazil, one of the major public health problems is the large circulation arboviruses transmitted by the *Aedes aegypti* vector, such as Dengue, Chikungunya, Zika and Yellow Fever¹¹. The increase in the incidence of these diseases is directly related to disordered urban growth, to the increase in the production of non-organic waste, to the lack of basic sanitation and infrastructure in cities, which combined with the inefficiency of public campaigns end up exacerbating their impacts¹³.

Among the several strategies to face this problem, the community's participation, in a conscious and active way, in the surveillance and monitoring actions of *Aedes aegypti* has been referred to as one of the main axes of an effective control program¹³. Studies already emphasize the importance of knowing the aspects that influence the health-disease process, being essential to list strategies that can minimize health problems¹³⁻¹⁵.

In this context, due to the complexity of actions involving control of *Aedes aegypti*, it is necessary to identify what are the attitudes and knowledge of the quilombola population about the control of the vector, seeking to understand the

particularities of this population and the influence of social aspects and environmental factors in this process. Despite the scarcity of the theme in the literature for the quilombola population, there is an expansion of studies that seek to know the way of life and the understanding of the populations about some medical conditions, and how this can impact the proliferation of these diseases^{14,15}.

The objective of this study was to evaluate knowledge and attitudes about the control of *Aedes aegypti* of quilombolas in the State of Sergipe according to socioeconomic, sanitary and environmental conditions.

METHODOLOGY

This is a cross-sectional study with a quantitative approach, whose subjects were the remaining quilombos in 2017, through data collection with the application of a structured questionnaire to assess the sociodemographic characteristics, knowledge and attitudes of the quilombola population regarding control of *Aedes aegypti*.

The research subjects were selected through the number of families registered at Fundação Cultural dos Palmares as quilombolas. Fifteen quilombola communities that are part of the catchment area of the Hydrographic Basins of the State of Sergipe were selected. The population was estimated in 1979 as adult individuals². For the sample calculation, the Barbetta formula¹⁶ was used. A sampling plan was carried out through random selection of quilombola communities, from those belonging to hydrographic basins through the existing proportion of the population in the communities. The total number of participants was 389 quilombolas.

Inclusion criteria were quilombo descendant individuals, residents and registered, over 18 years old, of both sexes. Those who agreed to participate signed the free and informed consent form previously read and explained (ICF).

Data were collected through a directed individual interview using a semi-structured

questionnaire, with the following variables: sex, education level, cell phone and Internet access, housing conditions, garbage collection in the homes, water use, basic sanitation, socioeconomic data for classification of social class, knowledge about the mode of transmission and control of the *Aedes aegypti* mosquito. The concept of health micro-region was considered for areas of the State that have similar territorial identities, taking into account environmental, economic-productive, social, cultural and political-institutional aspects; namely: Alto sertão, Baixo São Francisco, East of Sergipe and Greater Aracaju¹.

The results were analyzed by means of frequency distribution, bivariate analyzes between variables, perceptions and attitudes, knowledge of the subjects and health micro-regions. The chi-square test was applied, with an assumed confidence level of ≤ 0.05 . All ethical criteria established by the National Health Council were met with approval by the Research Ethics Committee of Universidade Tiradentes, with CAAE number: 57804416.3.0000.5371.

RESULTS

From the total of 389 interviewees, it was identified that the predominant age was 44 (± 17) years, with a minimum of 18 and a maximum of 101 years. The majority reported being female (72.2%), 50.4% declared themselves to be brown and 38% black. When asked about occupation, 60.7% of the subjects answered that they do not work. The distribution of schooling revealed that 57.3% of the interviewed subjects were illiterate or had incomplete primary education, only 11.6% had completed high school or incomplete higher education. An important percentage of the population (61.4%) reported knowing how to read and write. Regarding social stratification¹², it can be seen that 60.2% of respondents belonged to classes D-E.

The socioenvironmental characteristics presented in Table 1, highlight that although there is

no significant difference between the health micro-regions, an important percentage of quilombolas declared that they have a cell phone (84.4%) and Internet access (78.9%). Regarding access to drinking water, most people had piped water from

the distribution network, with “Greater Aracaju” presenting a higher rate (58.5%) of water use from a well or spring ($P < 0.001$). Regarding the infrastructure of the street in which they live, 55.2% of the interviewees stated that it is paved.

Table 1. Distribution of quilombolas’ socio-environmental aspects, according to health micro-region, Sergipe, Brazil, 2017

Socio-environmental aspects	Health Micro-region				Total	p
	Alto Sertão	Baixo São Francisco	East of Sergipe	Greater Aracaju		
Has a cell phone	n/%	n/%	n/%	n/%	n/%	
No	3 (11,1)	22 (21,7)	23 (12,04)	11 (15,71)	59 (15,1)	0,155
Yes	24 (88,8)	79 (78,2)	168 (87,9)	59 (84,2)	330 (84,8)	
Internet						
No	25 (92,6)	79 (75,2)	79 (41,3)	53 (75,7)	305 (78,4)	0,307
Yes	2 (7,4)	22 (21,7)	22 (11,5)	17 (24,2)	84 (21,5)	
Access to water						
Well or spring	2 (7,4)	31 (30,6)	54 (28,2)	41 (58,5)	128 (32,9)	<0,0001
General distribution network	25 (92,6)	70 (69,3)	137 (71,7)	29 (41,4)	261 (72,7)	
Street stretch situation						
Dirt/ gravel	15 (55,5)	42 (41,5)	91 (47,6)	26 (37,1)	174 (44,7)	0,265
Paved/unpaved	12 (44,4)	59 (58,4)	100 (52,3)	44 (62,8)	215 (55,2)	
Total	27 (6,9)	101 (25,9)	191 (49,1)	70 (17,9)	389 (100)	

Table 2 identified the specific attitudes of the subjects to control the vector, classified according to the health micro-region. Regarding gutter cleaning, 12.4% of participants reported not performing this intervention ($p=0.014$). In Baixo São Francisco it was identified that 15.1% of interviewees did not do it. As for cleaning the water tank, this practice was more effective ($P < 0.0001$), with the micro-regions of Alto Sertão (47.8%) and Baixo São Francisco (40.4%) showing greater adherence to this intervention, doing it two or more times a year. The attitude of cleaning plant pot saucers was well established (18.2%) among residents who claimed to have plants.

Another attitude mentioned by the interviewees to prevent the proliferation of the *Aedes aegypti* mosquito was the accumulation of rubble in the yard ($p = 0.045$), with 84% of respondents saying they kept their yards free from it. In Greater Aracaju,

there were higher percentages in relation to the other health micro-regions regarding the non-execution of this attitude (20.5%). Regarding the accumulation of standing water in the yard, an important percentage (94%) stated that they keep their yards free from it (Table 2).

Concerning the knowledge that the population had about the vector mosquito control, it can be seen that the majority (58.1%) of the interviewees knew how to inform which arboviruses could be transmitted by it, 78.9% answered that it was not possible to identify the bite of *Aedes aegypti* or distinguish it from that of another common mosquito and 69.2% stated that the mosquito needed to be infected to transmit these diseases. When asked about the possibility of confusing Dengue symptoms with a severe flu, most of them (54.2%) answered yes.

Table 2. Distribution of quilombas' attitudes on the control of *Aedes aegypti*, according to health micro-region, Sergipe, Brazil, 2017

Attitudes towards the control of <i>Aedes aegypti</i>	Health Micro-region				Total	P
	Alto Sertão	Baixo São Francisco	East of Sergipe	Greater Aracaju		
Gutter Cleaning	T=27 (6,9)	T=99 (25,5)	T=191 (49,3)	T=70 (18)	T=387 (100)	0,014
No	4 (14,8)	15 (15,1)	20 (10,4)	9 (12,)	48 (12,4)	
Yes	4 (14,8)	21 (21,2)	13 (6,8)	9 (12,8)	47 (12,1)	
No gutter	19 (70,3)	63 (63,6)	158 (82,7)	52 (74,2)	292 (75,4)	
Cleaning the water tank	T=23 (6)	T=99 (26,1)	T=189 (49,8)	T=68 (17,9)	T=379 (100)	<0,0001
Up to once a year	1 (4,3)	8 (8,1)	47 (24,9)	22 (32,3)	78 (20,5)	
Two or more times a year	11 (47,8)	40 (40,4)	37 (19,5)	15 (22)	103 (27,1)	
No regularity	0 (0)	20 (20,2)	0 (0)	1 (1,4)	21 (5,5)	
No water tank	11 (47,8)	31 (31,3)	105 (55,5)	30 (44,1)	177 (46,7)	
Cleaning plant pot saucer	T=27 (7)	T=99 (25,7)	T=189 (49,2)	T=69 (17,9)	T=384 (100)	0,3355
No	0 (0)	8 (11,1)	18 (9,5)	6 (8,65)	32 (8,3)	
Yes	5 (18,5)	19 (19,2)	39 (20,6)	7 (10,1)	70 (18,2)	
No saucers	22 (81,4)	72 (72,7)	132 (69,8)	56 (81,1)	282 (73,4)	
Rubble in the yard	T=26 (6,8)	T=99 (25,9)	T=188 (49,3)	T=68 (17,8)	T=381 (100)	0,045
No	25 (96,1)	78 (78,7)	165 (87,7)	54 (79,4)	322 (84,5)	
Yes	1 (3,84)	21 (21,2)	23 (12,2)	14 (20,5)	59 (15,4)	
Standing water in the backyard	T=27(7,1)	T=99 (25,7)	T=190 (49,3)	T=69 (17,9)	T=385 (100)	0,407
No	26 (96,2)	93 (93,9)	181 (95,2)	62 (89,8)	362 (94)	
Yes	1 (3,1)	6 (6,1)	9 (4,7)	7 (10,1)	23 (5,97)	
Cleaning drains	T=26 (6,7)	T=99 (25,8)	T=189 (49,3)	T=69 (18)	T=383 (100)	0,325
No	1 (3,8)	5 (5,05)	4 (2,1)	1 (1,4)	11 (2,8)	
Yes	17 (65,3)	54 (54,5)	94 (49,7)	32 (46,3)	197 (51,4)	
No drains	8 (3,8)	40 (40,4)	91 (48,1)	36 (52,1)	175 (45,6)	

* The total number of subjects analyzed varies in the total sample due to unanswered questions.

The relationship of the subjects' knowledge about the proliferation of the vector mosquito and the necessary attitudes to avoid it is shown in Table 3. Although there is no significant difference ($p > 5$) between these crossings, an important percentage

(60.8%) of respondents had stated that they had knowledge about the proliferation of the vector mosquito and, therefore, perform actions to combat and control its proliferation.

Table 3. Knowledge of quilombolas on the proliferation of the vector mosquito and necessary attitudes to avoid it, Sergipe, Brazil, 2017

Attitudes towards the control of <i>Aedes aegypti</i>	Knowledge about vector mosquito proliferation		Total	p
	No	Yes		
	n/(%)	n/(%)		
Gutter cleaning	T= 161 (41,6)	T= 226 (58,3)	387 (100)	
No	18 (11,1)	30 (13,2)	48 (12,4)	0,799
Yes	19 (11,8)	28 (12,3)	47 (12,1)	
No gutter	124 (77)	168 (74,3)	292 (75,4)	
Cleaning frequency of the water tank	T=160 (42,2)	T=219(57,7)	T=379(100)	
Up to once a year	28 (17,5)	50 (22,8)	78 (20,5)	0,341
Two or more times a year	40 (25)	63 (28,7)	103 (27,1)	
No regularity	9 (5,6)	12 (5,4)	21 (5,5)	
No water tank	83 (51,8)	94 (42,9)	177 (46,7)	
Rubble in the backyard	T=158 (41,4)	T=223 (58,5)	T=381 (100)	
No	127 (80,3)	195 (87,4)	322 (84,5)	0,60
Yes	31 (19,6)	28 (12,5)	59 (15,4)	
Standing water in the backyard	T=160 (41,5)	T=225 (58,4)	T=385 (100)	
No	150 (93,7)	212 (94,2)	362 (94)	0,847
Yes	10 (6,2)	13 (5,7)	23 (5,9)	
Cleaning plant pot saucers	T=160 (41,7)	T=233 (60,8)	T=383 (100)	
No	18 (16,1)	14 (8,2)	32 (11,3)	0,194
Yes	30 (26,8)	40 (23,5)	70 (24,8)	
No saucers	112 (39,7)	170 (60,2)	282 (100)	
Cleaning drains	T=160 (41,7)	T=233 (60,8)	T=383 (100)	
No	4 (2,5)	7 (3)	11 (2,8)	0,258
Yes	75 (46,8)	122 (52,3)	197 (51,4)	
No drains	81 (50,6)	94 (40,3)	175 (45,6)	

DISCUSSION

This study included quilombola individuals who have peculiar characteristics in relation to their socioenvironmental profile and knowledge and attitudes related to the *Aedes aegypti* mosquito. It was found among the 389 respondents a high percentage of quilombolas who declared they had no occupation, had less education (incomplete primary education) and low level of social stratification. These data corroborate studies carried out with

quilombola populations that show a situation of social vulnerability, due to the lack of access to education, the labor market, and low social strata¹⁷⁻¹⁹.

Despite the recognition by the Brazilian constitution of the quilombola population as minor and traditional groups, due to their ancestral practices and the valorization of Afro-Brazilian culture, their state of invisibility and exclusion is noticeable in the face of the lack of effective rights that prevent them from exercising their full citizenship²⁰. From

this perspective, it is necessary to combat social segregation caused by society, promoting the inclusion of this population through the creation and implementation of public policies focusing on their vulnerabilities.

An important fact observed was that the majority declared themselves brown, which is in agreement with the study carried out in the quilombola population that evaluated the use of health services in the Southwest of Bahia, where it was demonstrated that the majority of the interviewees were brown, followed by black people²¹. Other studies with a socio-sanitary focus, carried out with quilombolas from Paraíba and Amazonas, showed that the majority are black²²⁻²³. The quilombola identity is linked to their skin color and the recognition of their African ancestry, however it is noticeable the re-identification of Afro-descendants to brown color, due to the socially constructed stigma and is reinforced by slavery to black.²⁴ Therefore, it is necessary to rescue ancestry, distorted by society, with the construction of policies that preserve and value the quilombola culture and identity, through their inclusion in health and education services in the community.

Regarding the socio-environmental aspects identified in the study, it is important to highlight that quilombolas had cell phones and Internet access. There is already evidence demonstrating the effectiveness of the use of Information and Communication Technologies (ICT) providing services and care and guidance in distance health²⁵. Another advantage is the ease of obtaining health information through the use of applications or even when consulting a given Internet website²⁶. Access to health information and user behavior makes it possible for healthcare teams to easily manage the care of these individuals. A study carried out in a community in the State of Pernambuco detected the importance of the information content conveyed in the mass media and of the materials used in dengue prevention campaigns²⁷. Therefore, it is essential to create and implement policies and

programs focusing on the use of ICTs as a tool to promote and disseminate health concepts, thus being able to assist the quilombola population in actions to combat *Aedes aegypti*.

Although a large percentage of quilombolas declared that they have access to drinking water and infrastructure on their street, there are still individuals who reported not having access to basic sanitation services. This fact can contribute to the proliferation of the vector mosquito in the community. These data are in agreement with studies conducted in quilombola communities that also identified the lack of basic sanitation, precarious garbage collection service, and using water from artisanal wells and rivers^{7,18}. These environmental indicators can contribute to the proliferation of vectors and, consequently, to the increase in the incidence of infectious diseases in the community.

This study showed significant differences between the state's health micro-regions in terms of cleaning the gutter, cleaning the water tank and having rubble in the yard. Such behaviors are consistent with the research on knowledge and attitudes related to dengue in Sergipe, which also showed that cleaning care practices at home can contribute to the elimination of breeding sites and prevent the proliferation of the vector mosquito¹⁴. Other studies have also shown the importance of taking care of the environment in which they live, as it can promote the rapid proliferation of the vector agent²⁸⁻²⁹. In Pernambuco, a study in an urban community identified satisfactory practices for disease prevention and vector control in the majority of respondents, and the most common attitudes were those emphasized in free public information campaigns, such as not accumulating standing water and cleaning water tanks and backyards.²⁷ In another survey in Colombia, it was possible to show that the majority of respondents also reported important attitudes in the prevention of the vector, such as cleaning containers containing water as tanks³⁰.

Despite the innumerable strategies to eliminate vector breeding sites carried out by

the population in conjunction with the public authorities, studies show a high incidence of diseases associated with *Aedes aegypti*. This is due to the lack of awareness of the population in general, which, together with weaknesses in garbage collection, poor basic sanitation and the rapid adaptation of the vector, seem to contribute to the increase of these diseases.²⁹ The awareness of the population is extremely important to change attitudes and consequently better implementation of actions to combat the vector.

This study showed that quilombolas have knowledge about the control of the vector mosquito and its proliferation. This information is in accordance with a survey carried out in the city of Cartagena-Colombia, which showed that a significant percentage of respondents stated that the vector mosquito transmits diseases and that attitudes such as cleaning tanks, cleaning the house and avoiding standing water are essential to prevent its proliferation³⁰.

The quilombolas reported avoiding the accumulation of water in the backyards and performed the necessary care with the cleaning of the plant pot saucers. Studies that evaluated the attitudes and knowledge of the general population related to vector control also identified these practices as essential actions in the fight against breeding sites and, consequently, its proliferation^{27,15}. The presence of breeding sites in a community can increase mosquito outbreaks and the incidence rates of diseases associated with *Aedes aegypti*¹⁴. Epidemiological surveillance actions associated with social mobilization campaigns should be intensified in order to destroy the breeding sites present in the communities.

The low social participation in combating the vector may be associated with a lack of knowledge and attitudes about the *Aedes* mosquito²⁹. Knowing the particularities of each population is necessary to better plan health education strategies, to identify social determinants related to the vector and to implement social mobilization actions³⁰. Thus, it is extremely important that healthcare teams are well aware of the socio-environmental reality experienced in quilombola communities and that health actions

mobilize this population to combat the vector.

There was a small, but important percentage of quilombolas who reported not having knowledge about the proliferation of the vector and did not take action to combat it. These data corroborate a study showing that knowledge and attitudes in combating the vector mosquito are insufficient, especially due to the low participation of the community in the actions promoted by the health units.¹⁵ Therefore, greater investments in educational measures are necessary in order to facilitate the dissemination of knowledge to the quilombola population and the change in practices.

CONCLUSION

The data presented in this work show that the socio-environmental aspects identified in the study have a great influence on the control and proliferation of the *Aedes aegypti* mosquito. The specific attitudes of quilombolas towards vector control, identified in the health micro-regions of the State of Sergipe, were well implemented. Greater Aracaju, despite being the most populous micro-region, the state capital, with more investment in health, education and basic sanitation, did not gain prominence compared to the other health micro-regions in relation to attitudes to combat the vector mosquito. The research also demonstrated that the knowledge about the vector and its control were also adequate. The study has limitations regarding the design that does not allow interference on the directionality of associations. It is suggested that further research be conducted in order to enable more accurate investigation.

Educational approaches including popular participation must be increasingly valued in conjunction with actions of epidemiological and environmental surveillance. It is important to know the socio-cultural context and understand how the quilombola population recognizes the determinants of diseases and their forms of prevention, the

traditional model of public campaigns must be overcome, including aspects related to culture, habits, beliefs and particular environmental risk in the construction of actions. In addition, to provide a change in habits, actions must have an interdisciplinary and multisectoral character at the individual and collective level. It is up to the healthcare teams to create educational strategies aimed at this population in order to facilitate the dissemination of information related to fighting the vector, so that they can overcome the difficulties evidenced.

It is also essential that public authorities pay more attention to the inclusion of quilombola communities in the actions that will be carried out in health campaigns, taking into account their particularities. The implementation of a water supply system, sanitation and infrastructure of the community's streets can improve environmental indicators by reducing the formation of breeding sites.

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