

## The social face of *Aedes* control: women take the floor in a suburban district of Fortaleza, Brazil

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**Abstract** *Aedes aegypti* is currently a critical disease agent and is responsible for viruses such as Zika, Chikungunya and Dengue's four serotypes. This mosquito's relevance to the current social body has come to the fore and triggered urgent EcoHealth investigations since this approach aims to articulate different theoretical fields to understand the historical linkages between nature, society and health. Based on an ethnographic premise, this study considered the unequal and unfair conditions that make women's health vulnerable to dengue, analyzing their practices and perceptions about the potential breeding grounds in the public space. A semi-structured interview and participant observation, as well as a field diary, were used to compose the study. The research included the participation of ten women living in the outskirts of Fortaleza, Ceará, Brazil, from January to August 2014. The category "Social inequality, context and practices in the public space" emerged from the content analysis. The narratives revealed that unstable living conditions and evident social inequality might influence in a context permeated by waste, with great potential for dengue's mosquito proliferation.

**Key words** Dengue, Waste, Poverty areas

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## Introduction

We have just celebrated the 30<sup>th</sup> anniversary of the Ottawa Charter, and Zika, Chikungunya and Dengue diseases remind us how the principles of health promotion have been rarely considered in those years<sup>1</sup>.

*Aedes aegypti* is now a major disease-transmitting agent and is responsible for diseases such as Zika (ZIKV), Chikungunya (CHIKV) and the four Dengue serotypes (DENV-1, DENV-2, DENV-3, DENV-4). The presence of this mosquito in urban space near humans has resulted in high endemicity and frequent outbreaks of these diseases<sup>2-4</sup>.

Dengue, for example, as soon as it is transmitted to man by its vector, causes a viral infection, and in some situations can develop into a potentially deadly state, resulting in severe dengue. Dengue is estimated to produce between 50 and 100 million infections each year in more than 100 countries where it is endemic<sup>5</sup>.

In Brazil, where the climatic characteristics favor the presence of the transmitting mosquito, with the presence of the four dengue serotypes, the disease condition is also relevant, with 67 deaths until the Ninth Epidemiological Week of 2016. In Ceará, the first months of the same year recorded an increased number of cases of the disease compared to the previous year, however, with a 20% reduction in the number of deaths, totaling five in 2015<sup>6-8</sup>.

Capital of the State of Ceará, Fortaleza is one of the largest metropolises in Brazil, and is an easy target for dengue epidemics, since it carries peculiarities of the large centers. Such cities have undergone an accelerated and unplanned urbanization process, with social inequality, where processed and disposable products are consumed, access to and frequency of water supply is inadequate, garbage collection is insufficient and the environment is harmed<sup>9-15</sup>.

Despite the social factors surrounding the dengue problem, it is known that the disease can manifest in any individual at any age. However, it is common for women to get sicker in numbers larger than men. This is probably due to the domestic nature of the vector and also because the spaces where the disease is most transmitted, the intra-household and the peridomicile, are the places most visited by female subjects<sup>16,17</sup>.

Besides the aforementioned aspects, another factor that contributes to the participation of the female gender in this study builds on the critical role assumed by women in the domestic environ-

ment, where they are still the main responsible for home care and the elimination of dengue breeding sites<sup>18-20</sup>.

It should also be considered that, although studies point to a preference of the mosquito for the domestic space<sup>21,22</sup>, this one may make use of reservoirs inadequately disposed in the public space (streets) for the laying of its eggs<sup>15,22-24</sup>, an irrefutable condition in this study, since there was excessive garbage in the streets before this phase of the research, with evident potential dengue breeding sites, which makes research involving the peridomicile relevant.

Dengue control actions are still focused on epidemics emergencies, with few preventive interventions, favoring the use of larvicides and communication between the endemics control workers and residents. Dengue requires a systemic approach to its control, an investigative species that considers the biological, behavioral, ecological, political and economic elements that involve this agent<sup>25-28</sup>.

Thus, this paper covers elements that permeate EcoHealth research, an approach that aims to articulate different theoretical fields to understand the historical linkages between nature, society and health, considering the realms of social inequality, gender, lack of basic sanitation and the conditions of injustice that make health and well-being of women around dengue vulnerable, aiming at analyzing practices and perceptions about potential dengue breeding sites in the public space<sup>29,30</sup>.

## Methods

By adopting the resources of anthropological research, we invested in the ethnographic approach to this study<sup>31,32</sup>, which allowed us to access the space of the subject of interest, seeking to gain its trust and achieve space in the field, staying there, participating in that environment, as anthropologist Malinowski would say, to interpret a culture from “dense descriptions”<sup>33</sup>.

Ten women aged 24 to 65 years were enrolled. Most of them were in a common-law marriage status, of which two were divorced and one widow. Only one had no children and all were from the inland state of Ceará. The interest in female participants was because of an earlier research where the prevalence of women in care was noted by researchers. Also, the authors report that women participate more in home-based research and, to this today, are the ones responsible for domestic care and dengue breeding sites<sup>18-20</sup>.

Some participants were selected through the social mobilizer of the region during their working hours. In other cases, the approximation with the residents was conferred by the progress of ethnographic research.

Because it is the branch of a multicenter project supported by the World Health Organization, developed since 2010, the space selected to set the locus of the research had been explored in previous occasions, and is one of the factors that increased the interest in the area studied, because undue water storage practices and excessive garbage in the streets were detected.

At that moment, some questions triggered the interest in the current research: why are there so many cases of the disease in that region and so many dirt found in the streets even in the face of so many guidelines promoted by the public power about the dengue hazards?

Twenty visits were made to the district of Pequeno Mondubim in Fortaleza from January to August 2014 to answer this and other questions. Because of the short field stay period available, we maximized daily the exploration of the environment, speaking whenever possible with women, establishing rapprochement, since, in this way, we believed this responded ethically to the questions of the study, observing, therefore, a methodological rigor.

Field visits were always held in the morning, as recommended by the social mobilizer because of the routine of the offenders of that region. Violence in the place was a significant setback for this research since it occurred in the presence of the professional and the latter had extra-field activities.

Participant observation technique was used to collect data. Following the assumptions suggested by Malinowski, one of the founders of social anthropology, the method is achieved through intimate coexistence with the natives under study. Thus, a “dialectic between experience and interpretation” was established through this technique, seeking a way of acting in the field that favored a better social relationship with the respondents, visiting them, greeting them, just waving, “delimiting the territory” while observing their daily life and context<sup>31,32</sup>.

The use of the field diary was admittedly useful for recording all the content observed or experienced: impressions about the place, life of women, reflections of the daily routine of the research, later useful for the analysis and structuring of the information referred to herein<sup>32</sup>.

A semi-structured interview was used to explore the manifestations of social actors' views on

the theme, an essential means of fostering dialogue. Interviews lasted thirty minutes to an hour<sup>34</sup>.

Finally, the interviews were minutely transcribed and thoroughly read, focusing on the emergence of common, similar themes. The statements were then grouped as per these themes, analyzed, interpreted and reinterpreted, confronted with other dialogues and the context, aiming at not only common elements but also differences. Then, we sought to link “the studied event to the social totality in which it is inscribed and, and also understand its specific realms”<sup>31,32</sup>.

The Content/Thematic Analysis<sup>35</sup> was adopted to organize and codify this information, from which the critical category for this study emerged, namely: “Social inequality, context and practices in the public space”. The research was approved by the Research Ethics Committee of the State University of Ceará (UECE).

## Results and discussion

### Social inequality, context and practices in the public space

The 1988 Constitution establishes housing as a social right to all Brazilians (BRASIL, 2010), but even with a series of political programs aimed to this end, among them the Growth Acceleration Program (PAC) and the National Housing Plan (PlanHab), a deficit of around 7.9 million housing units is currently estimated for Brazil<sup>36,37</sup>.

About two and a half million people reside in Fortaleza, of which 396,370 live in 509 sub-normal clusters, that is, irregular occupations, without ownership deed and, in many cases, in poor conditions. The number represents 18% of the population living in the city<sup>38</sup>.

Given these recent data, it is assumed that thirty years ago, when some women or their family members arrived at Pequeno Mondubim, the housing deficit was even more significant for the volume of people entering the city. Also, economic conditions did not provide them with much choice in the face of high real estate prices, making them opt for cheaper properties in regions farther from the city center<sup>9,39</sup>.

[...] *there's a lack of money to afford a better place. I could not afford a better place and I did not want to live on rent. So, the only money I had was to buy it here. (Rosário, Mondubim – 27/05/2014).*

Also, social policies to assure the right of every citizen to a decent dwelling are inefficient, giving rise to the need to seek a place to live in. In

some cases, this may occur through the purchase of illegal real estate because of the affordable cost to the most popular layers of society. This is the case of Pequeno Mondubim's dwellers, whose scarcity generated the acquisition of illegitimate property, some without ownership deed, ensuing difficulties in the provision of services<sup>9</sup>.

*When we came here, we had no energy, no water, no sanitation until today. No sanitation to this day [...] we used water from dirty waterholes, and energy was provided through an illegal connection, and this connection had supply swings. (Rosário, Mondubim – 27/05/2014).*

Sometimes, buildings in suburban areas are erected by the residents in inappropriate places, causing impacts on the existing natural environment. Landfills, soil pollution and deforestation usually occur in these places, interfering with the ecosystem and landscape, affecting the quality of life of residents, which are exposed to floods, overflows and an inhospitable place with no visual attractions<sup>9,12,40</sup>.

*It was open land, with only carnation and parsley, there were little shrubs, and that's it! [...] When it rained, it swelled with water [...] we have a large floor to build our dwelling place on. (Lourdes, Mondubim - 14/05/2014).*

... Rain poured down here in Fortaleza. A house was flooded through the front and backyard. Mine was spared, as I only had cockroaches coming out of the drain. I think water did not flow because the sewage here was clogged up. The ditch in the front is filled with material, debris. (Socorro, Mondubim – 27/05/2014).

These occupations should also be considered as proximity to water-enveloped environments because of the need for their use by the population. In this way, the dwellings are built on land that should be protected for the preservation of waters. The chronic face of this issue is that watercourses are often also used for final garbage disposal<sup>41</sup>.

*...he, on his own, entered the ditch and took out the rubble from inside. He found a couch, toilet inside, something that is not supposed to be there inside. Only water should run in there. [...]. There were a broken chair and brick debris. (Socorro, P. Mondubim – 27/05/2014).*

*The sewage you have is sewage over there in the back. So much that they are already clogging it. People are doing it. They are gathering to clog it up over there in the back, making slabs to clog it up, because it's too many rats and cockroaches... (Clara, P. Mondubim - 29/05/2014).*

The aforementioned authors condition these "aggressions" to the environment to people's

cultural habits. Another study that analyzed the opinion of social actors in the city of Fortaleza found a similar response, where practices with waste disposal are determined by old rural habits of "dumping the garbage"<sup>42</sup>. The term "garbage dumping" reveals that this is a common practice in irregular land occupation<sup>12</sup>.

In the case of this study, several factors contributed to this common practice of "throwing away the garbage" and this could be seen already in the debut of that community. Thus, dwellers built their homes with no sewage service in place, and there was a need to dispose of human waste somewhere; the creek and the lagoon of the district were erroneously chosen for this purpose. The change from creek to sewage that has occurred over the years has modified the impression of residents who have also seen it as the most suitable place to dispose of garbage: "In the urban context, the environment's conditions [...] are influenced, among other factors, by the perception of its inhabitants, that stimulate and engender the environmental picture, setting the construction of the beliefs and habits that conform the use"<sup>41</sup>.

The report of the struggle of women and other residents of Pequeno Mondubim for a healthier environment, aiming to obtain from the competent bodies road asphalt paving, drainage and sewage services, also speaks of the lack of unpolluted political representatives who would facilitate the acquisition of these rights. Thus, concerning sewage, the most helpful attitude for those people was to create a landfill by throwing several debris or building slabs. Therefore, the influence of collective human behavior in the face of the maintenance of potential dengue breeding sites in the public space is conditioned by social and personal variables that are interlinked with the political inefficiency of providing adequate housing and services to that population.

*... and here, the people in this little piece of land, we help each other to take care of ourselves. [...] we live here by ourselves, we provide benefits, we clean up, it's only us here... (Conceição, P. Mondubim – 19/05/2014).*

*... in the case of this street here, we have been living here for twenty-three years, and the street is the same, and getting worse by the day [...] You can only cross by boat when it rains here in this street; we are at the mercy of God! They never did anything for this street. They don't pave the streets; they don't do anything at all! (Rosário, P. Mondubim – 27/05/2014).*

Other elements were identified as determinants for garbage disposal practices in the old

creek, and they were: floods that constantly devastated that community, causing emotional and material damages; the quantity of garbage produced and disposed of daily without immediate destination, thus contributing to the proximity of sewage to homes and the desire to dispose of those objects which, when understood as being useless and attractive for diseases, should be placed far from homes<sup>43</sup>.

It is essential to point out that, because it is a disordered environment, without urbanization or improvements, the place assumes the features of poor conditions and attracts the presence of politicians promising improvements to the population<sup>9,44</sup>, and, with each change of mayor, needs were gradually supplied, and water, electricity and garbage collection were in place quicker. To this day, sanitary sewage and drainage services service only one of the streets under study and also originated from political action, while paving, after long periods of struggle, is a result of the resources of the community itself.

*Power people do not see this (referring to the district's poor conditions), only from politics to politics, they pass by, promise this and that, but they do nothing. [...] we live the best that we can. (Tereza, P. Mondubim – 22/05/2014).*

There is evidence of improved supply of health services in the suburbs of the country, and these reach a near-universal level of water supply and garbage collection, but these benefits were not enough to streamline the living conditions of the low-income population when compared to other parts of cities<sup>45</sup>.

This is also evident in Fortaleza and the district in question. While these services have set in this place, there are indications that they are not evenly distributed, nor are they of sufficient quality, or serve the community sufficiently. For this reason, some residences may have pits, cisterns, wells and fountains<sup>46</sup>.

*It's because water is not available some days; supply stops just like that when you least expect it. We get furious [...] Since there are a lot of waterholes here, we use them a lot, then we ask neighbors who have a water tank. (Clara, P. Mondubim – 29/05/2014).*

Besides the structural factors mentioned that so well make up the suburban constructions, one must also refer to the economic conditions of the population in these places, which clearly represents the social inequality in the cities, since favelas are also seen as urban poverty concentration spaces, where its population has lower levels of income and education<sup>47</sup>.

Poverty is a fact in Pequeno Mondubim. People in hunger, unemployment, lack of perspective and education live there<sup>48</sup>. And the environment in which many of these families live, whether represented in their homes or the streets, reflects the contrast between central and peripheral neighborhoods, although the participants have not always made that distinction.

Thus, the essential question that involved this discussion was: how is it possible for that population to implement continuous dengue control when they daily face the consequences of social inequality<sup>29,49</sup>?

In this study, we can observe that poverty, as a result of social inequality, could interfere with daily practices with potential dengue breeding sites in the public space, insofar as specific problems are more critical in their daily lives; that is, in this community, housewives, who are more responsible for domestic care, have different responsibilities within the household, such as caring for their children, husband, feeding, domestic care<sup>18,19,50</sup> and concerns about working to provide support to the family, a very recurrent situation for women of the current society<sup>19,51</sup>.

*... I work and I live here. [...] I am a seamstress, I work for companies, I have this faction [...] my life takes me off a lot of essential things, in case I become more participatory in social issues, even to have fun too and information, because I am trapped in time. (Glória, P. Mondubim – 25/03/2014).*

By permeating the daily lives of these women, poverty, represented in the construction of their poorly finished homes, in the simplicity of their homes, in the low educational level, in unemployment or in informal employment, and in the uncertainty of providing food at the table, make work as the only source of improvement or stability of living conditions achieved so far, given the problematic past.

As a result, while they affirm keeping healthy habits in the peri-domiciliary environment, it may be that these practices are lost or are not continuous due to other more urgent concerns<sup>52</sup> since potential dengue breeding sites are easily seen in that environment<sup>53</sup>.

We therefore emphasize that, in the face of an environment already corrupted by filth, their impossibilities in promoting lasting changes in the local and daily living surrounded by demands relevant to their lives, these women feel discouraged to give continuity to these practices, since, as much as they play their part, garbage leaves their homes, but continues to surround them in the external environment<sup>54</sup>.

It is understood that the inhabited space is the scene of the experiences of its members, “an object of consumption from which the user appropriates in the privatization mode”<sup>55</sup> or insofar as it allows its usufruct. When this does not occur, it loses meaning, becoming only a transit place for people. So why take care of it? The report of a resident clarifies the question:

... I'm sure that if it was a recreation area, everyone would be cleaning it every day. I would have gone there because people would like to clean it. The way that it is now, who is going to like cleaning the bush? (Socorro, P. Mondubim – 27/05/2014).

It has also been seen that social inequality interferes with people's relationship with their environment; that is, the responsibilities and the aching needs of the daily routine overlap with the environmental urgencies. Thus, even if perceived, the environment may suffer reckless aggressions, influencing the presence of potential breeding sites in the public space<sup>41</sup>.

While human intervention is recognized in the occurrence of potential dengue breeding sites in the public space, multiple factors influences such practices. The women of Pequeno Mondubim know well the days of garbage collection and mention conditioning the bags that must be left out on the sidewalks, putting them in this location only at collection time; separating the garbage to prevent scavengers or animals from spreading it; sweeping the sidewalk and sometimes exceeding their responsibilities by cleaning or paying others to clean the scrubs that lie on land close to their homes and accumulate litter. They say it is the responsibility of the resident to clean the peridomicile and one cannot wait for the municipality. So, where does excess garbage come from in that space?

... we have to store the trash well in the bag, [...] and the day the car comes to pick up, we put the trash out. (Conceição, P. Mondubim – 19/05/2014).

... So, today is Friday; the pick-up car comes tomorrow. So, in times like this, I start to gather the garbage, I put it in the backyard. Then, at the end of the day, I place it in the area. (Graça, P. Mondubim – 23/05/2014).

Some people do not have public space as their own, and it is the responsibility of the government. Thus, there is a contradiction between cleaning practices with the household space and the sidewalk, since they keep these environments clean, in contrast to the lack of interest in the destination of garbage in the public space<sup>56</sup>.

Differently from what happened in the above study, where the participants showed a lack of in-

terest in the destination of garbage in the public space, for this research, it may be that the interest for the surrounding environment occurs through the disbelief that the city plays its role and also the constant campaigns which strengthen the idea of sustainability and the attribution of responsibility to the population, also carried out by the media and health professionals.

*I don't see cleaning, because you see that trash over there (she shows the land in front of her home). You see that garbage there... [...] ... the bush was lower more because I took the hoe cleaned it up [...] The municipality comes once in a long while... to clean this. It's been a long time since I've seen the municipality here cleaning these bushes... (Socorro, P. Mondubim – 27/05/2014).*

It may be that, by asserting executions deemed appropriate with the surrounding environment, they are only reproducing the discourse given in the media or health professionals, thus revealing the “symbolic power”<sup>20</sup> exercised by those who guide such practices without, however, carrying them out. Still, we highlight the desire of many of these women to stay in a clean environment, beyond garbage-related diseases, such as dengue.

Some authors argue that the media has a vital role in disseminating information that promotes the autonomy of the population in health processes, because they are easily accessible<sup>27,57</sup>, but it will not always be possible to produce continuous changes in attitudes and reach all members of society, as some studies have shown about the control of breeding sites in the private space<sup>53,58,59</sup>.

The reality of Pequeno Mondubim in the face of dirt also facilitates the perception that other residents do not want to keep garbage in their homes, which means that they put them out on the recommended day or throw them in the sewers behind the houses, to further degrade the image of public space<sup>60</sup> and favor the proliferation of the dengue mosquito. This is most evident from the reports of women blaming the neighbors or other residents of the neighborhood for the dirt in the environment.

The population that throws the garbage out; if it is dirty, they don't clean it, or they clean it, they leave the garbage there leaning; they don't gather it in a bag and will not throw it away. I think it's the people's conscience (Socorro, P. Mondubim – 27/05/2014).

Women also blame their neighbors for dengue, revealing the lack of hygiene and cleanliness of their home space<sup>52,57</sup>, so it would not be different if the other was blamed for inappropriate practices with public space.

## Final considerations

When considering several social factors underlying the dengue issue, from the knowledge about the district studied, this study allowed us to understand the life of the participating women and their accounts, what poor conditions of life may influence in a context permeated by unclean environments, with a potential proliferation of the dengue mosquito.

We did not intend to dissociate the meaningful community participation in dengue control, but we understood that this action could often be suppressed in the face of daily difficulties, typical of a social reality historically underpinned by social inequalities, which succeed each other and are maintained by the lack or weak political action to minimize social inequalities, improve living conditions and urban space in suburban areas.

## Collaborations

KKF Oliveira worked in the concept and design or data analysis and interpretation and drafting of the paper. A Caprara worked on the relevant critical review of the intellectual content and final approval of the version to be published.

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