PERCEPTION OF SOCIAL ACTORS RESPONSIBLE FOR THE MANAGEMENT OF SOLID WASTE IN THE CONTEXT OF DENGUE

Percepção de atores sociais responsáveis pela gestão de resíduos sólidos no contexto da dengue

La percepción de los actores sociales responsables de la gestión de residuos sólidos en el contexto de la dengue

Original Article

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ABSTRACT

Objective: To analyze the perception of social actors responsible for managing solid waste in the city of Fortaleza-CE, Brazil, in the context of dengue. **Methods:** The research, comprised in a multicenter study, is descriptive, exploratory and qualitative, performed in October and November 2010. Data was collected through open interviews with representatives of the Municipal Secretariat for the Environment and Urban Control (Secretaria Municipal do Meio Ambiente e Controle Urbano), that were submitted to the content analysis. **Results:** The following categories were evidenced: characteristics of institutions; habit of poor waste conditioning; important role of multidisciplinarity; possible solutions. There is a socio-cultural complexity related to poor waste conditioning, requiring greater multidisciplinary involvement. **Conclusion:** Perceptions of these actors reflect that the population has the habit of improper refuse disposal, regardless of economic features and worsened by the lack of infrastructure for the transit of collection trucks, also being possible to verify the complex relationship between dengue and garbage, which depends on changes in habits, education and government investments.

Descriptors: Dengue; Solid Wastes; Perception.

RESUMO

Objetivo: *Analisar a percepção de atores sociais responsáveis pela gestão de resíduos sólidos no município de Fortaleza-CE, Brasil, no contexto da dengue.* **Métodos:** *Trata-se de uma pesquisa inserida em um estudo multicêntrico, descritiva, exploratória e qualitativa, realizada no período de outubro a novembro de 2010. Coletaram-se os dados por meio de entrevistas abertas com os representantes da Secretaria Municipal do Meio Ambiente e Controle Urbano, as quais receberam análise de conteúdo.* **Resultados:** *Evidenciaram-se as seguintes categorias: características das instituições; hábito do mau acondicionamento; importância da multidisciplinaridade; possíveis soluções. Há uma complexidade sociocultural relacionada ao mau acondicionamento do lixo, sendo necessário maior envolvimento multidisciplinar.* **Conclusão:** *As percepções desses atores refletem que a população, independentemente do fator econômico, possui o hábito de descarte inadequado do lixo, com o agravamento da falta de estrutura para trânsito dos caminhões de coleta, sendo possível verificar a complexa relação entre dengue e lixo, a qual depende de mudança de hábitos, educação e investimentos governamentais.*

Descritores: *Dengue; Resíduos Sólidos; Percepção.*

RESUMEN

Objetivo: *Analizar la percepción de los actores sociales responsables de la gestión de residuos sólidos en el municipio de Fortaleza-CE, Brasil, en el contexto de la dengue.* **Métodos:** *Se trata de una investigación de un estudio multicéntrico, es descriptiva, exploratoria y cualitativa, realizada en el período de octubre a noviembre de 2010. Se recogieron los datos a través de entrevistas abiertas con los representantes de la Secretaria*

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Municipal del Medio Ambiente y Control Urbano en las cuales se realizó el análisis de contenido. **Resultados:** *Se evidenció las siguientes categorías: características de las instituciones; hábito del mal acondicionamiento; la importancia de la multidisciplinaridad; posibles soluciones. Hay una complejidad sociocultural relacionada al mal acondicionamiento de la basura, siendo necesario más implicación multidisciplinar.* **Conclusión:** *Las percepciones de esos actores reflejan que la población, independientemente del factor económico, posee el hábito de tirar la basura de manera inadecuada asociado al agravo de la falta de estructura para el tráfico de camiones de recogida, siendo posible verificar la compleja relación entre el dengue y la basura, la cual depende de cambios de hábitos, educación e inversiones del gobierno.*

Descriptores: *Dengue; Residuos Sólidos; Percepción.*

INTRODUCTION

Dengue, one of the major public health problems in the world, affects every year 50 to 100 million people who live in urban and rural areas, especially in between the tropics[1]. In the XXI century, Brazil reached the first place in the international ranking comprising all cases of the disease, with more than three million reported from 2000 to 2005. This represented 78% of the amount recorded in the Americas and 61% of all records by the World Health Organization (WHO)[2].

Fortaleza, capital of the state of Ceará, located in the Brazilian Northeast, presents a urban environment suitable for Dengue transmission, since it is placed in a hot region of the semiarid, constituted by 2,505,650 inhabitants, in a high demographic density territory[3]. In 2010, the Municipal Health Secretariat (Secretaria Municipal de Saúde-SMS) of Fortaleza notified 6,086 suspected dengue cases, 3,792 (62.3%) of which were confirmed. In that same period, 68 suspected cases of severe dengue and 4 deaths due to dengue with complications were notified. In 2011, 1,088 cases were confirmed in January, 844 in February and 473 in March[4,5].

A variety of determinants favors the proliferation of the mosquito that transmits the disease, *Aedes aegypti*, such as climatic factors, disorganized urbanization, population growth and socioeconomic conditions[6-10]. Other important points that aggravate the situation are the poor packaging of solid waste and poor sanitation, including inadequate garbage collection and irregular water supply[11-13]. Therefore, the population is forced to store water in tanks inside the home, however, without performing proper cleaning and closure of these reservoirs, thus contributing to the proliferation of the mosquito[14]. Regarding the waste, the population tackles the insufficient collection and ends up discarding the solid waste in improper ways, dropping it off in their own backyards or in the streets, damaging the environment and thus generating risks for the community[15].

The high consumption of disposable products such as PET bottles, plastic cups and bags makes people produce an increased amount of waste. This is reflected in the issue of dengue, as these products are potential breeding sites for the vector, especially when not packaged correctly. The big selling of automobiles, for example, contributes to enlarge tire manufacturing; when no longer used, these are often thrown away into the streets and wastelands, leading to worsening of the disease[13].

Given this, it can be seen that dengue has not only one cause, but there is a complex scenario involving sociocultural and environmental elements that favor the multiplication of mosquitoes. Consequently, the disease control demands the development and implementation of integrated solutions that take into account the inter-relationships between the environmental, social, cultural and economic factors, and that involve different social actors: local populations, researchers and managers in diverse fields[16].

Therefore, the eco-bio-social approach appears, based on the union of several methodological fields and contexts in order to increase understanding of the complex interactions between the various elements of ecosystems (biophysical, socioeconomic and cultural) and their influence in the health of humans. It also aims at pointing out ecosystem management strategies with the participation of the various actors involved, developing integrated solutions, namely proactive interventions that promote the welfare of the population, including the improvement of living conditions and the ecosystems survival.

Such approach relies on three methodological fields: transdisciplinary research, involvement of all the actors, and social and gender equity[17]. In the issue of dengue, it longs to intervene in the determinants of illness, such as garbage, with the goal of changing environmental conditions, social contexts and other factors that favor the proliferation of vectors, using participatory multisectoral approaches for sustainability over the long term[18].

Thus, this study aims to analyze the perception of social actors responsible for solid waste management in the city of Fortaleza-CE in the context of dengue.

METHODS

This qualitative, exploratory[19] and descriptive study was conducted comprising the social institutions responsible for solid waste management in the city of Fortaleza-CE, Brazil.

These institutions, described as 'social actors' are represented by the Environment and Urban Control Municipal Secretariat (*Secretaria Municipal do Meio Ambiente e Controle Urbano - SEMAM*), the concessionaire managing the solid waste of Fortaleza (ECOFOR) and the Urban Maintenance and Cleaning Company (*Empresa de Manutenção e Limpeza Urbana - EMLURB*). SEMAM and EMLURB are state-owned enterprises, while ECOFOR is a private company that renders services to the city of Fortaleza.

The first contact with these ators occurred by phone, when the first interviews were previously scheduled for the months of October and November 2010. The interviews were recorded and followed a semi-structured script, on the questions: What role does the institution play, in the context of dengue, regarding the determinant factors of the disease in the city? What is the perception of the institution regarding the management of the solid waste and its conditioning in the city? What is the perception of the institution regarding the implementation and the planning of actions for dengue control current in the city, and what are the possible solutions for the problem?

The interviews were then transcripted in full and submitted to content analysis[20]. Applying such analysis can assist in uncovering what lies behind the expressed content, revealing not only the appearance of what is being studied, but also its depth[21].

After exhaustive reading of the transcripts and content analysis, the following categories emerged: characteristics of institutions; habit of poor packaging; importance of a multidisciplinary approach; possible solutions.

For better identification of the interviewees, fictitious names were given for each of them. Thus, the interviewee from SEMAM is Joana; from ECOFOR is Regina; and from EMLURB is Núbia.

In compliance with the ethical principles of Resolution 196/96[22], which deals with human research, this study was approved by the Ethics Committee of the State University od Ceará (Universidade Estadual do Ceará), with protocol number 09553425.

RESULTS AND DISCUSSION

Roles and characteristics of the institutions

This first category will present briefly the roles and characteristics of institutions that influence the scenario of dengue.

Joana reports that, in SEMAM, there is not a role directly related to the context of dengue and clarifies:

> *'We are a department of political and institutional integration. Our role is to put everyone in the same room [...], to get people to discuss, articulate. When we say that something was built or renovated, it is because we managed people [to] do so. We do not put a brick, and neither have we team to be on the street.'*

It is perceivable that she plays the role of an articulator, since the institution does not have the resources to modify or accomplish something. However, SEMAM has been developing some projects addressing the issue of dengue. Among them, Joana highlights the conventional selective waste collection. This project proposes that residents separate the wet waste from the dry one, and this one goes to the sorting centers. In these centers, garbage collectors would be settled during work and would no longer wander around the city with their carts, and any sale of such material is to be donated to them. Joana has not confirmed how this collection is going to operate, in fact, just reported that a sorting center nearing is being built in a neighborhood (Bom Sucesso), where, so far, 30 collectors are registered. This refuse warehouse is intended to serve the districts of João XXIII, Genibaú, Conjunto Ceará I and II, Granja Portugal, Jóquei Clube, Henrique Jorge, Dom Lustosa and Autran Nunes.

This project is noticeably more linked to the issue of the social inclusion of the garbage collectors. Nevertheless, it ends up indirectly influencing in the selective collection of waste, favouring its better reutilization in the recycling industries and, the most important, removing it from the environment. But Joana points out a logistical barrier regarding the waste transport, since there are no trucks to bring the material from the households enrolled in the program to the warehouse, being the collectors so far responsible for this function.

It is noteworthy that this project is supported by the National Policy on Solid Waste[23], Law 12.305/10, section XXVII of the heading of the article 24 of Law 8666[24], June 21, 1993. There is, therefore, a partnership between the Union and the municipalities for achieving this selective collection.

However, a study[25] reveals that only 8.2% of the Brazilian cities develop any project on selective collection, with more frequency in the South and Southeast region. A research[26] on the experience of the selective collection programme of the city Maringá-PR has identified as positive points: the implementation of the project 'ReciclAção', that has avoided the access of the collectors to the municipal refuse dump, since it has become a controlled dump; the recognition of the garbage collectors as environmental workers, bringing appreciation to their function and integrating them into the society; awareness for the community, which is stimulated to make the selective collection; and improvement of the quality and quantity of the material intended for cooperatives. As negative points

are: the difficulty of recycling agents in absorbing the information provided by the city government, due to their low education level; little availability of garbage trucks; and the lack of regularity in attendance.

Solid waste generation is proportional to urban growth. When they are deposited in inappropriate places, bring a lot of problems that affect the health of the population and the environment. This fact requires greater concern and effort on the part of the public collection services in order to prevent the accumulation of rubbish[26].

Joana mentions another project, which deals with the tires. It is supported by the legislation[27] and linked to Sindiônibus, a collective transport company acting in the state of Ceará, which produces large amount of worn or unserviceable tires. They are taken from the company and taken to the cement plant Ceinatar in Sobral-CE, where they are burned to heat the furnaces of the plant. However, it is not only Sindiônibus that discards tires, tire-repair shops and drivers also dump them in the streets. In fact, any institution generating large amounts of waste is responsible for its allocation to the associations and cooperatives of waste pickers, or for taking other appropriate measures[28]. Moreover, the intense production and selling of vehicles increases the amount of tires placed in improper areas in the environment[13]. Joana reveals that there are 6 trucks in each regional collecting about 9,000 tires per week.

Other activity developed by SEMAM is the environment education programme in 95 risk areas in Fortaleza. According to Joana, it is elaborated in the first semester, that is, in the rainy season. She clarifies:

> *'We develop activities of environmental citizenship. So the question of the trash in the backyard is addressed. We form multipliers for the environmental education in the risk areas [...]. The SMS has this activity Clean Backyard, which is fantastic, and with respect to dengue, it is essential, but we work in parallel the issue of environmental citizenship.'*

The concept of risk area goes beyond the measurement or the probability of events occurrence; it permeates the complexity theory, which encompasses the relationship between health/disease/care and social processes[29]. Therefore, risk area refers not only to unhealthy territorial spaces, more exposed to the forces of nature, but also conditioned by a series of social and economic factors that affect in a coercive way the emancipation and human development[30].

Concerning the role played by EMLURB in the context of dengue, Nubia states that the company has an obligation to clean up the public spaces. Currently, some activities are developed, such as: works involving the issue of waste with students in the municipal school; the project for selective collection with solidarity, that aims the social inclusion of waste pickers, where there is orientation regarding the care with the trash and diseases caused by it; 'Relive', the project, which caters to seniors within the logic of social responsibility, where they perform leaflet distribution, post banners and talk about dengue within EMLURB; and the 'Streetcar of elderly' (*Bonde dos coroas*), a carnival block formed by elderly people, with the partnership of the Subway of Fortaleza (METROFOR) and the Fire Brigade band, which performs a train ride from Fortaleza to Caucaia, every year in the month of February. During the journey, besides dancing and singing carnival music, the participants receive guidance and educational pamphlets on dengue prevention and preventive measures against STDs.

As to ECOFOR, according to Regina, it develops the service of household collection and disposal of garbage. She reveals that Fortaleza produces about 3,500 tons of garbage per day, about 70 tons per month, which are allocated to the landfill dump. She adds:

> *'We have that very close relationship in order to work in the fight against dengue. That work is not the focus of ECOFOR, but it is embedded within that process.'*

This institution features an environmental education programme, called Ecocidadão, which addresses the issue of dengue. Regina explains:

> *'We work in areas identified [as] the most critical regarding the loose waste, which is the waste exposed in improper ways, trash dump, wastelands, the habit of throwing [trash] in the river, the sea [...] and develop a long-term work.*

A study[11] of 2008 on the implementation of environmental education workshops to prevent dengue in the district of the Archipelago, in Porto Alegre, found that participants gained knowledge about the disease, but did not change their attitude with regard to the decrease in breeding sites. This is another point that needs to be understood in order to move forward in dengue control.

Besides this work, ECOFOR offers training courses for multipliers and short workshops for groups of elderly, hip hop dancers and church movements, in addition to door-to-door campaigns and graffiti courses, all facing the issue of waste, its proper destination and the diseases arising from it.

In this context, the companies EMLURB and ECOFOR have strong influence with regard to the collection of garbage, one in public areas and another in the households. Their actions complement each other to ensure the cleanliness of the city, although it is not easy for a region that has more than two million inhabitants.

Habit of poor packaging

The three interviewees indicate that the population is also responsible for the spread of the mosquito *Aedes aegypti*, since it continues throwing garbage in the streets and often poorly conditioned.

According to Joana, the worsening of dengue is a historical question. For her, people who live in big cities come from the interior and bring with them the act of 'dumping into the bush'. "Dump into the bush' is an old expression, however, still widely used in the routine of people from Ceará, which means to discard the trash out of containers suitable for this. This practice was observed in rural and inland areas and did not cause so much damage because there were not many artificial breeding. However, with the growth in consumption, the production of these artificial reservoirs and migration of people to urban centers, this expression has spread, both in practice and in speech. She comments:

> *'Bringing such habits from the interior to the city, in my point of view, is one of the reasons that contribute to the onset of grievances to health, like dengue.'*

Regina also shares that thought:

> *'The great challenge is to talk to the population, so that it leaves the feeling of 'dumping into the bush', that is cultural, historic, to [enter in] the feeling of co-responsibility.'*

For the actor to become co-responsible for a change, it is necessary that he feels useful in the process, with power to participate and make decisions, controlling his own life with quality and social fairness[31]. An example of that is health promotion[32].

Núbia adds:

> *"As we consume more and more disposable goods, the more people dump them, or the more people 'dump it into the bush', as they say, and then, this improper conditioning occurs.'*

As pessoas estão consumindo cada vez mais produtos não recicláveis, o que aumenta a produção de lixo[33]. A coleta de lixo domiciliar de Fortaleza, segundo Regina, é realizada em três dias da semana: segunda, quarta e sexta ou terça, quinta e sábado, em locais diferenciados. Ela complementa:

> *'All the trucks in the empresa have GPS, so we know the places where they have been to or not [...]. We know where all the trucks are, their speed, how long they have been kept there.'*

And Joana questions:

> *'If everyone knows which days the truck comes and the waste collection does not fail, since the cars have a chip and are under surveillance, daily monitored through GPS, then why is it that the city is full of garbage?'*

There is the need to implement an integrated evaluation along with the population in order to realize their perception about this issue and the possible ways of engagement to alter such reality.

An aspect that Regina highlights regards the difficulties for the trucks to reach the risk areas, due to: '[...] low wiring, lack of paving, winding road [...]. All these disrupts the way of such a truck, that is very unstable and loads 9 tons of garbage. Steep slopes and meandering tracks might make it tip and even overturn onto a house.'

This fact is corroborated by the perspective of a study[26] stating that the destination of the household waste contributes for the spread of the mosquito. Many times, when the collection is deficient or is not performed in hard-to-access areas, the residents are compelled to throw the rubbish away in wastelands and in their own backyards.

Such context is not liable to contribute for the effective role to be played by ECOFOR. These are infrastructure problems of the risk areas that, if not solved, through control and surveillance by the city government and participation by the very own population, are going to remain and, who knows, worsening people's health[34,35].

According to Regina, in Fortaleza 1,800 historical spots of refuse dumping have been identified in 2010. These are places where the cleaning is frequently performed, but the population keeps on dumping waste. Regina features this as a process demanding a shift in people's behavior. But not exclusively in the risk areas one finds garbage. In wealthy regions one can also find ruins debris, rubbish from commercial establishments, solid household waste. construction debris, scrap merchants and solid waste. This reinforces the lack of education of the population and the lack of supervision by the municipality in relation to large producers of waste[35,36].

Breeding sites, reservoirs that favor the proliferation of mosquitoes, are classified into natural and artificial. The former represent the bromeliads, tree trunks and xaxins, the latter are those manufactured by humans, such as tires, cans, abandoned buildings and swimming pools, water tanks uncapped, plant vases, bottles etc.[37-39].

A research[40] has assessed the knowledge, attitude and practice regarding the issue of dengue in the community of Santa Rosa. It revealed that only 36% of residents reported receiving some preventive activity in their home. Reservoirs found in the residences account for the main breeding of dengue vector and it is already widespread among society[40]. Thus, it is up to residents to become proactive in identifying and controlling breeding sites at home.

The importance of multidisciplinarity

Because it is a grievance with several determinants, dengue cannot be addressed solely from the perspective of health. Other disciplines, actors and agents are also responsible for its management. Nubia points that out:

> *'There is no work being done separately. No use EMLURB cleans, cleans, cleans ... if that educational work doesn't happen. Because it will be always doing it or the Health Secretariat trying to treat people because some will be affected to death. It will not be able to handle everyone. So, this is a whole. We have a very strong speech as a multidisciplinary team. There are several names that work together but, in practice, it is difficult, isn't it?'*

A study[41] about the perceptions of agents in dengue control activities in São Paulo found that, for a better understanding of the multidisciplinary feature of dengue, it would be necessary to launch a more integrated intervention between the diverse responsible agencies. With control activities linked to the promotion of health, there would be no way to separate other items, such as education, sanitation and living conditions.

Joana exemplifies by means of an action realized in 2010, a cleaning campaign that was coordinated with other sectors, such as ECOFOR, the Health Secretariat, SEMAM, social mobilization and health education personnel. The Health Secretariat put raticide at the rubbish heap; SEMAM, social mobilizers and health educators did environmental education activities with the residents, and ECOFOR attended with a mechanical shovel and removed the trash. Joana adds: 'We removed 1,200 rubbish heap from March to April'.

When asked if ECOFOR would solve the problem of dengue, Regina states:

> *'No. Not alone. Especially because the theme encompasses other areas. There is the issue of waste, the issue of population, the city government... So, the public authorities have to punish with fines, take initiatives through public policies directed at these aspects.'*

She reports ECOFOR's partnerships with the Health Secretariat, SEMAM, EMLURB, Regional Secretariats, urban sanitation districts, the districts of environment and health districts. It can be seen that the three interviewees are aware of the importance of partnerships between the various social actors, since dengue extrapolates the walls of health.

Possible solutions

Regina highlights some easy actions to be performed in order to reduce the incorrect disposal of waste, such as: separating waste into recyclable and non-recyclable; disposing it in trash bags and only on the time of collection and delivering the recyclables to a waste picker that passes on the street, some association or to one of the 10 delivery stations that ECOFOR provides in the city. It also clarifies that, aiming to change people's behavior, we need to conquer them. Furthermore, this change depends on the way the interventions are being carried out.

Nubia bets that one should invest in formal education, with lectures and competitions in schools and broader community participation in environmental education. However, she claims that information is not enough, it demands punishment. She compares:

> *'Why does everyone in Fortaleza use seatbelt? Nobody used to wear. Seatbelt was an ornamental accessory in the car. Why did everyone begin using it? Because the fine was R$150.00. [...] If there is no fine, if the 'guy' does not feel in the pocket, forget it.'*

In Cingapura, the fines work as legislation measures on properties where breeding sites are found[42].

Regarding the wastelands, Núbia explains that the owners of grounds are responsible for the site and should build the wall and sidewalks to prevent these areas from being exposed. Joana believes there should be maturity and charging involving a political decision from the democratic participation, similar to what happened to the health sector through the conferences. But she considers a challenge this awakening of society, because the environment is regarded a diffuse and confusing right, since it is, at the same time, for everyone and anyone. She also points out the importance of advertisements on prevention, which are fundamental to the practice of the population's everyday life. Besides them, she cites environmental education and dissemination of knowledge as relevant points to be taken further.

Another study on the situation of dengue in urban slum[43] states that it is important to understand how the community behaves toward dengue, so that more participatory projects are designed to control the disease. The change in behavior depends on the degree of apprehension and interpretation of a particular sociocultural organization.

It is exactly in such a perspective that institutions participating in this study seek to carry out their activities with the community. But it is necessary to identify how these are being developed. It is important to ask whether it was made a preliminary assessment with regard to people's knowledge about the disease, their living conditions and level of understanding.

FINAL CONSIDERATIONS

Perceptions of social actors responsible for the solid waste in the city of Fortaleza reflect that the population has the habit of improper disposal of garbage. They claim that

this attitude, inherent to the cultural traits of those who lived in the interior regions, is frequently seen in the big cities. Would it be a cultural problem or lack of education?

If we take into account that the garbage collector trucks are monitored, have day and time scheduled for transporting in the streets and people are informed of this, it is lack of education. However, it was observed that, in some areas, especially the risk areas, the trucks do not circulate due to lack of adequate infrastructure, which could explain the attitude of those who, with no option, throw the solid residues on the environment.

It was also clarified that the more privileged areas of the city are found empty lots and abandoned houses full of trash. The issue of increased consumption of disposables favors the increase of breeding sites for mosquitoes, especially when these are poorly packaged by the population.

People do not know how to deal with the waste produced. Once dropped, their consciousness is relieved, since the responsibility rests with the collecting company. The population gets rid of that abundant amount of waste and transfers the problem to waste management agencies. Therefore, the studied companies are committed to working with environmental education activities, through lectures and workshops with the various residents of the communities. However, the activities are isolated and focused only on areas of risk, although they should be held throughout the city.

When analyzing the perceptions of the subjects, it was possible to verify the complexity regarding the relationship between dengue and garbage. We expect to have contributed by discussing and analyzing these perceptions and as it was demonstrate that there is a constant concern in the sector of solid waste management on this issue. However, it is recognized the weakness to carry out actions that result in changes in habits, not only with respect to the improper disposal of garbage, but also the awareness of reducing the production of abundant domestic waste today.

At last, there is an extremely complex relationship betwwen the garbage and the population which needs to be studied and understood, so that new activities are developed, aiming to reach the goal of disease prevention and health promotion.

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