The invisibility of Amazonian singularities in the design and delivery of Primary Health Care (PHC) services: A case study in the rural riverside area of Manaus (AM)[1]

Invisibilidade das singularidades amazônicas na organização e oferta de serviços de Atenção Primária à Saúde (APS): Estudo de caso na área rural ribeirinha de Manaus (AM)

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Abstract

The Amazon region encompasses a heterogenous territory with singular geographic features, that harbous different vulnerable populations, which require the development of abilities and innovations by health services. However, answers to this challenge become even more distant in the face of a marketing logic that tends to make differences invisible and privilege certain territories. In this scenario, our study analyzed the implementation of a Basic River Health Unit (UBSF), seeking to understand how the needs and singularities of riverside rural areas are included in the planning and execution of health services. To that end, interviews with health services managers and professionals and observations of health care professionals during daily activities were carried out. The results showed the forecast of services, with specific formats and resources for the Amazonian fluvial areas, was an opportunity for the specificities of the region to be evidenced and for more resources, including financial ones, being considered for these localities. However, they also showed that the services offered are still planned in a hierarchical way and organized and executed for urban areas, which points to the need for adaptations.

Keywords: Rural Health; Primary Health Care; Health Services Administration; Health Equity; Amazon.

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Resumo

A região amazônica abrange um território heterogêneo com características geográficas específicas, abrigando diversas populações vulnerabilizadas, o que exige dos serviços de saúde o desenvolvimento de habilidades e inovações. Entretanto, as respostas a esses desafios se tornam ainda mais distantes diante de uma lógica mercadológica, que tende a invisibilizar diferenças e privilegiar determinados territórios. Nesse cenário, este estudo analisou a criação de uma Unidade Básica de Saúde Fluvial, buscando compreender como estão incluídas as necessidades e singularidades do meio rural ribeirinho no planejamento e execução dos serviços de saúde. Para isso, foram realizadas entrevistas com gestores e profissionais, além da observação do cotidiano dos serviços de saúde. Os resultados demonstram que a previsão de serviços, com formatos e recursos específicos para as áreas fluviais amazônicas, foi uma oportunidade para que as particularidades da região fossem evidenciadas e que mais recursos, inclusive financeiros, fossem previstos para essas localidades. No entanto, evidenciou-se também que os serviços ofertados continuam sendo planejados de forma hierárquica, além de serem organizados e executados visando realidades urbanas, o que aponta a necessidade de adaptações.

Palavras-chave: Saúde Rural; Atenção Primária à Saúde; Gestão de Serviços de Saúde; Equidade em Saúde; Amazônia.

Introduction

The Legal Amazon has the worst health conditions in the country, with a malnutrition mortality rate due twice that of Brazil. In addition, the average maternal mortality rate in Amazonian municipalities is almost three times higher than the Brazilian average. The reality in rural areas of the region is even more serious: only 8% of the population enjoys adequate water supply and 3% is served by a sewage system (Santos et al., 2014).

These unfavorable conditions are added to the lack of strategies, innovations and investments to offer health services in areas outside the urban centers of this territory (Fausto et al., 2022). In addition, the region lives with inequalities in the distribution of health services, which are concentrated in the urban areas of the municipalities, leaving residents of rural areas with the challenge of reaching them (Garnelo et al., 2018).

These challenges for the health system tend to be more difficult to overcome in the face of a growing trend in the country of expansion of logics that favor the interests of the health market to the detriment of a universal and equitable offer provided for in the principles of the Brazilian National Health System (SUS)(De Seta; Ocké-Reis; Ramos, 2021) . This exacerbates the inequalities that exist in this region, where the most vulnerable are those who have least access to health care services (Galvao et al., 2019).

In this sense, the growing number of studies in the field of health have a fundamental role to elucidate the supply of services in the Amazon region. However, many issues still need to be addressed. Among them, we highlight the need to analyze health services provided to population living in rural areas of predominantly urban municipalities. This is the reality of Manaus, the largest metropolis in the Amazon, which has rural characteristics in 97% of its territory. In these locations, which have characteristics such as isolation, low population density and difficulties in accessing goods and services, live more than 9,000 people (IBGE, 2011). However, since they represent a small percentage of the population of the municipality and are inserted in a city with almost 2 million people, their existence

and needs tend to be disregarded in the planning of the municipality's health actions(Sousa; Monteiro; Bousquat, 2019).

At the federal level, the exclusion of these populations was also evidenced when the Prevent Brazil Program, established by Ordinance No. 2,979 (Brasil, 2019), considered Manaus as an urban municipality, when stablishing the financing rules for primary care, which implies the transfer of resources to the locality without considering the needs present in its rural areas. This situation is contrary to the importance of policies and the need for governmental spheres to turn to these realities, since the support and forecasting of financial resources are essential for health services to be able to act in the face of the singularities of territories (Versteeg; du Toit; Couper, 2013).

On the other hand, it is also possible to identify public policies that take into account the differences that exist in these locations, such as the National Primary Care Policy (PNAB)(Brasil, 2012). In this version and in the following one (Brasil, 2017), the PNAB began to provide for health units and extra resources specific to rural riverside areas, implementing new models of health teams in these locations. One of these models is the Fluvial Family Health Team (FHST), which operates in the Basic River Health Unit (UBSF). In this model, health teams can include professionals in addition to what is provided by the Family Health Strategy (FHS) and have exclusive support structures. It is worth mentioning that Manaus has been delivering health services to rural riverside areas for more than 25 years, even before the provisions of national guidelines, including with a health unit that operated on a ship (Pucciarelli, 2018).

Given this scenario, we analyzed the implementation of a UBSF in a rural riverside locality in Manaus, focusing on the strategies of organization and practices of health services. The findings of this study are fundamental because they deepen the knowledge of health services in a space that tends to have its demands neglected in the face of the health needs of the large metropolis, pointing out the priorities for policies, managers and researchers in the construction of health services in this reality.

Methodology

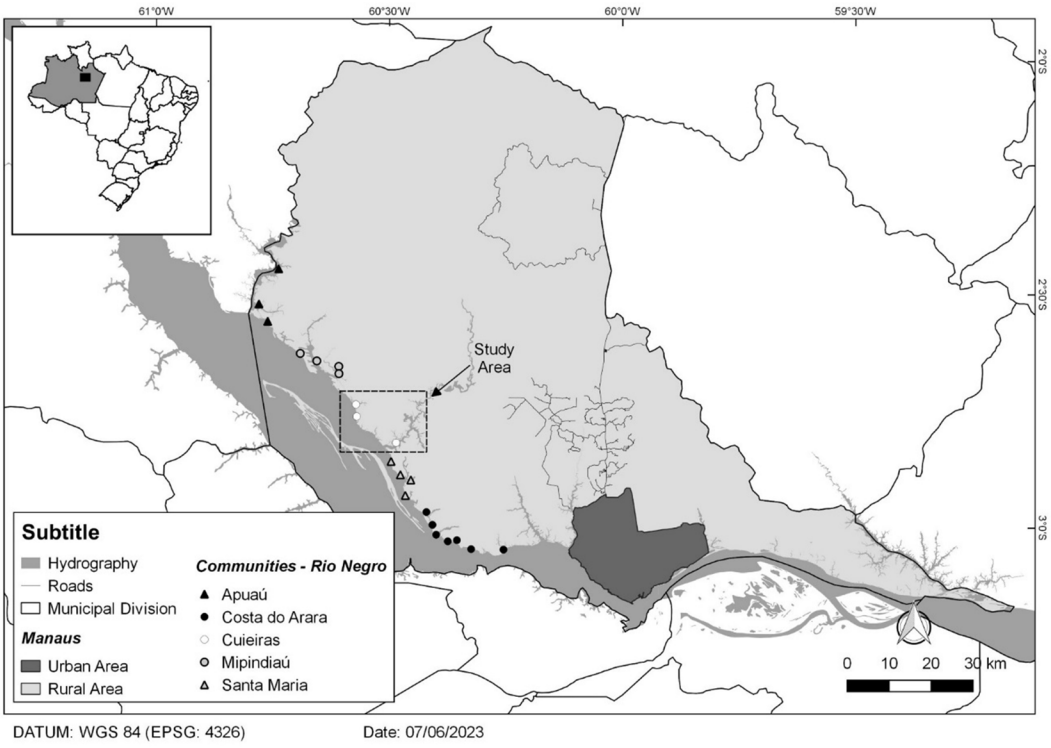
This is a qualitative research that followed the methods *of Case Study: planning and methods*, byYin (2015), including participant observation of the functioning of health services on site and semi-structured interviews with managers and health professionals in a rural locality on the Manaus river.

The rural areas of Manaus, located on the left bank of the Rio Negro, are only accessible by river and are divided into 38 locations, where approximately 2,342 people live, according to the register of the Municipal Health Department (SEMSA). To organize the service to these areas, SEMSA divided the territory into five service areas (Figure 1), with Cuieiras being the area analyzed in this study.

In this location, participant observation was carried out, following the steps listed by Queiroz et al. (2007), using a daily notebook. This observation was performed in two moments. In the first, relevant aspects of daily life and interaction of the residents with the health services provided in the locality were observed. The work of the Community Health Agents (ACS) was observed, and the geographical coordinates of each households visited were recorded, and plotted on a map to visualize the extent of their routes. The second moment occurred during the presence of the UBSF in the locality. At this stage, the preparations for the arrival of the UBSF were observed, including the arrival of residents from other communities. Once the UBSF was moored, the procedures and services performed were observed.

The findings of the observations, together with the material on services in rural and remote areas, made it possible to list the categories that guided the construction of question scripts for managers and professionals. For the former, the categories Organization/Planning; Adaptation of actions to the place; Monitoring/Evaluation were listed; for the latter, Relationship with management; Adaptation of actions to the place; Work process; Satisfaction with the performance model. All managers and health professionals who make up the main structure of care in the Cuieiras community were interviewed, for a total of 14 interviews.

Figure 1 – Area covered in this study



Source: Prepared by the authors. Data from the Brazilian Institute of Geography and Statistics (IBGE), National Agency of Water and Basic Sanitation (ANA), Municipal Health Secretariat of Manaus (SEMSA)

The analysis was carried out following Minayo (2012), based on the observations and interviews´s data which were sorted and typified with the aid of the MAXQDA Plus software. The classification took into account the previous categories, from which extracts were made. Then, a synthesis effort was carried out whichshowed the relevant structures in each category. For the analysis, the historical and contextual elements that allowed the interpretation of the observations and the analyzed speeches were considered, and the answers were divided into two groups ("managers" and "health professionals"). The group of health professionals also included the contents of the responses of workers stationed in the locality.

Results

Our results were organized as a sequence that starts from the identification of the place studied, followed by the separate results of observations and interviews with managers and health professionals.

Characterization of Cuieiras

According to SEMSA's registration, about 415 people live in Cuieiras. It is located 80 kilometers from the urban area of Manaus, which means a boat ride of about 10 hours or more, depending of the power of the engine and the river regime, whether in a flood or ebb period.

The Cuieiras is composed of a larger community, called São Sebastião do Cuieiras, where most of the residents live, and smaller communities and isolated houses in the streams (the smaller arms of the main river). Only part of the homes have access to electricity, and the water they consume is usually drawn from wells, collected from rainfall,

or collected from rivers. Access to the mobile phone network is discontinuous and with a very weak signal, with scarce internet access. The only institutions in the community are a school, which serves up to high school, and the health center (PS).

The PS installed in Cuieiras already functioning before the implementation of the UBSF foressen by he PNAB. The health unit is located in the community of São Sebastião do Cuieiras c, operates on a daily basis and has a director, who is a nursing technician, appointed by SEMSA, and a team composed of three (ACS). In this unit are kept the medical records and information of the people served, some basic medicines and materials for collecting malaria exams.

With the installation of the UBSF, funded by the federal government from 2018, the PS continued to work as a reference unit for the Cuieiras service area, being the place that people go to in the absence of the UBSF. In the current format of operation, foreseen by the PNAB, the UBSF remains in Cuieiras one day a month and, in the presence of this unit, the PS functions as a support point where the screening of the people who will be attended by the UBSF is carried out.

Managers and health professionals

The interviews included managers working in the general coordination of SEMSA and in the Rural Health District (DISAR), the health professionals of the UBSF (two doctors, one nurse, one dentist and one pharmacist), the director of the PS and two ACS, who work in the locality. Most of the managers and health professionals are statutory employees of the city hall and had previously worked in some other sector of SEMSA.

For the hiring of managers and professionals in these locations, there is no criterion of eligibility, skills or prior training related to rural health, except for ACSs, who must meet the criterion of living in the location where they intend to work.

Tables 1 and 2 present the categories that emerged from the analyses proposed for managers and professionals.

Practices of managers

The managers' discourse reveals the prioritization of following federal guidelines, from which they build and organize the services that will work in Cuieiras.

Table 1 – Summary of emerging contents with the performance of managers in rural areas of Manaus, from previous categories

Categories	Summary of emerging contents
Organization/Planning	Concern to comply federal guidelines; same goals foreseen for the urban area; focus on health in urban areas; focus on logistics issues; planning based on inconsistent data on the population; organization/planning of actions centralized in the health disctict headquarters t; weaknesses in interaction with the population; opening initiatives for the participation of the population; conflicts between managers and professionals.
Adaptation of actions to the singularities of the Amazon territory	Increasing the number of services as a solution; innovations created to meet the specificities; focus on logisticals issues; recognition of the need for more time of the team in the territories; difficulties in communication with users; difficulties due to the constant mobility of the population; difficulties at work due to the lack of technologies; need for more funding; timely contact with rural areas ; recognition of the importance of the territory conditions; recognition of differences; recognition of the effort required of professionals due to the specificities; they recognize that it is important the ACS to live in the local.
Monitoring/Evaluation	Same goals foreseen for urban locations; evaluates current monitoring as good; evaluates current monitoring aspoor; problems in monitoring due to limited technology; there are spaces for supervision and exchange between managers and professionals; difficulties with population data; implementation of monitoring under construction.

In their speeches, the managers stated that there are differences in the riverside areas and recognized that they require several adaptations to what was proposed by the PNAB. According to them, some of the planned provisions need to be even more flexible to allow modifications according to the needs they have to deal with. In this sense, they highlight the case of river regimes and the differences between territories, which impact travel durations and the number of people served. The following statement suggests this perception of managers:

> *I hope, as a servant of the municipality of Manaus, that these policies consider the specificities more. Of course there ought to be guidelines, but they need to leave space for us to include the specificity* (Manager 2).

In planning the health actions of the municipality of Manaus, the managers admit that the priorities of rural areas are not valued, and that they take what is proposed for the urban area as a basis to act in these areas: "The portfolio of services is uniform, for both the urban or rural area, it is the same" (Manager 4).

In the managers' responses to the challenges faced by the differences that exist in rural Amazon, logistics was prioritized. In their speeches, it is also evident that they consider the geographical conditions of the Amazon region as a factor that makes it difficulti to perform the services:

> *When I think of rural land, I have to think of the accessible vehicle, so I have to have a suitable vehicle that usually has to be pulled, different from an urban area that I can go with a small car* (Manager 2).

Another strategy present in the statements of managers as a possible response to the challenges with they face is the increase in the number of services. They see this increase as a most suitable way to reach rural and remote populations and improve services: "develop more strategies to improve access" (Manager 4).

Monitoring prioritizes the accounting of care, as suggested by the following statement: "There is a monitoring that is focused on care that, evaluates what has been done, how much has been done, how many visits has been made by each professional" (Manager 6).The Managers meet monthly with professionals and ACS; however, according to the managers' discourses, these meetings are a way to transmit to the professionals what has already been planned by DISAR and to demand the performance of the proposed actions.

Practices of professionals

The statements of the health professionals suggest many differences in their conduct when compared to the actions in conventional units, revealing several adaptations elaborated over the years so that they could act.

Table 2 – Performance of health professionals in Cuieiras

Categories	Summary of emerging contents
Relationship with management	They believe that different financial compensation is necessary because of their work; they complain about not having space to participate in the construction of the models; conflicting relationship; they feel invisible to management; managers who do not visit rural areas and do not know the reality; management sees the work of the rural area as the same as that of the urban area; high turnover of managers; monthly meetings only for administrative issues and accountability.

continue...

Table 2 – Continuation

Categories	Summary of emerging contents
Adaptation of actions to the place	ACSs report that they have carried out different training; UBSF professionals complain about the lack of training, because they had not have specific training for the rural area; they claim that they need better training to carry out their activities; they listen to the people of the place; they feel the need to have a greater scope; lack of strategies with the use of technology; they report adaptating some actions; carrying out a survey on the population; ACS demonstrate knowledge of the population with which they work; UBSF professionals admit that they need to know more about the population; limitations of the population for participation; difficulties with population turnover; they recognize that drought or flood require different strategies; little appreciation of the knowledge of ACSs; they need specific training towork in rural areas; previous experience as a fundamental element.
Work process	They seek to be more resolutive; they feel the need to act with a greater scope; they recommend a biomedical action; the performance of ACSs is broader; they work with medicines in addition to those available in terrestrial health units; they work with the protocols of the Ministry of Health; professionals, center director and ACSs resent that they can no longer act with curative procedures; rules for acting are unclear; they understand that the proposed model has limitations; the adaptations they make to provide services are not officialized; recognize that the time they stay in the localities is short for what should be done; periods of drought and river flooding interfere with the performance of services; ACSs are those who make visits to the locality's households; absence of technologies; lack of medicines and cleaning material in the PS; uncomfortable and risky conditions experienced in the UBSF; lack of fuel to work; material to small emergency procedures is no longer sent to the PS; the boat used by ACSs for home visits is of their property; they report little turnover, they are usually the same professionals.
Satisfaction with the performance model	They recognize that not all residents of the area have access to services; the lenght of time that the UBSF stays in the community is insufficient; difficulties with referral; feel that this is the only way to provide care; need for professionals with different backgrounds/specialties; difficulties in monitoring people; recognize limitations of the care model; believe that care is better than in the urban area; consider it fundamental to recognize that no community is the same as another.

According to them, some of these adaptations had to be reviewed with adherence to the UBSF model provided by the PNAB, among them, the replacement of a curative approach - a predominant approach in the previous fluvial unit - by preventive actions. They also emphasized that, even with the proposed innovations, the operation of the UBSF continues with limitations, especially in relation to the short period of service dedicated to the community (only one day per month), which hinders the proposed action and makes the planned promotion and prevention actions unfeasible: "We do the same as the urban area does but. in a different way, because our time is limited in these communities" (Professional 4).

In addition, they pointed out shortcomings of the referral to the secondary level of care, emphasizing that it did not work in practice: " So, we attend all programs, give a medication, but when we refer to a specialist for follow-up, we do not get a return, they do not seek it, they give up" (Professional 2).

The professionals' statements also revealed uncertainties about how they should act and the difficulties they encounter. According to them, there is a lack of a clear management stance on the model that should guide their actions, and they are divided between adopting an individual care conduct with a focus on biomedical care, given the accumulation of demands and because they are the only trained professionals in the region, or prioritizing prevention and promotion actions. In their speeches, these professionals also demonstrated physical exhaustion and recognized that they have not performed a good service: "[...] at the end of the day

I have my hand on ice, I know my limit and patience, we get angrier" (Professional 1).

Another issue highlighted by the professionals are the periods of flooding and drought of the river, which forces them to change the way they act, since at certain times the UBSF is unable to travel and needs more of the performance of the ACS and the director of the PS who are fixed in the community.

UBSF professionals stated that the reduced period at the sites requires them to be more operational. One of the professionals emphasized the need to prescribe drugs considering the time they will be absent, which causes them to increase the dosage and work with drugs that would not be indicated, as can be seen in this speech:

> [...] *so they are children who do not have adequate food, malnourished, people who will not give the medicine sometimes at the right time, that the parents cannot read and we sometimes end up sinning by excess and immediately enter with antibiotics because we know that child will get worse, so in this we do not follow protocol* (Professional 1).

Another professional emphasized that the UBSF dispenses drugs beyond the standardized ones in health units in the urban area, making available to them the same list provided for a specialized health center (Policlínica). However, they recognize that it would be ideal if professionals were trained to use these drugs.

The ACS conduct daily home visits. Among other things, they take blood pressure and check blood suggar, and they to collect samples and prepare the slides from suspected malaria cases.

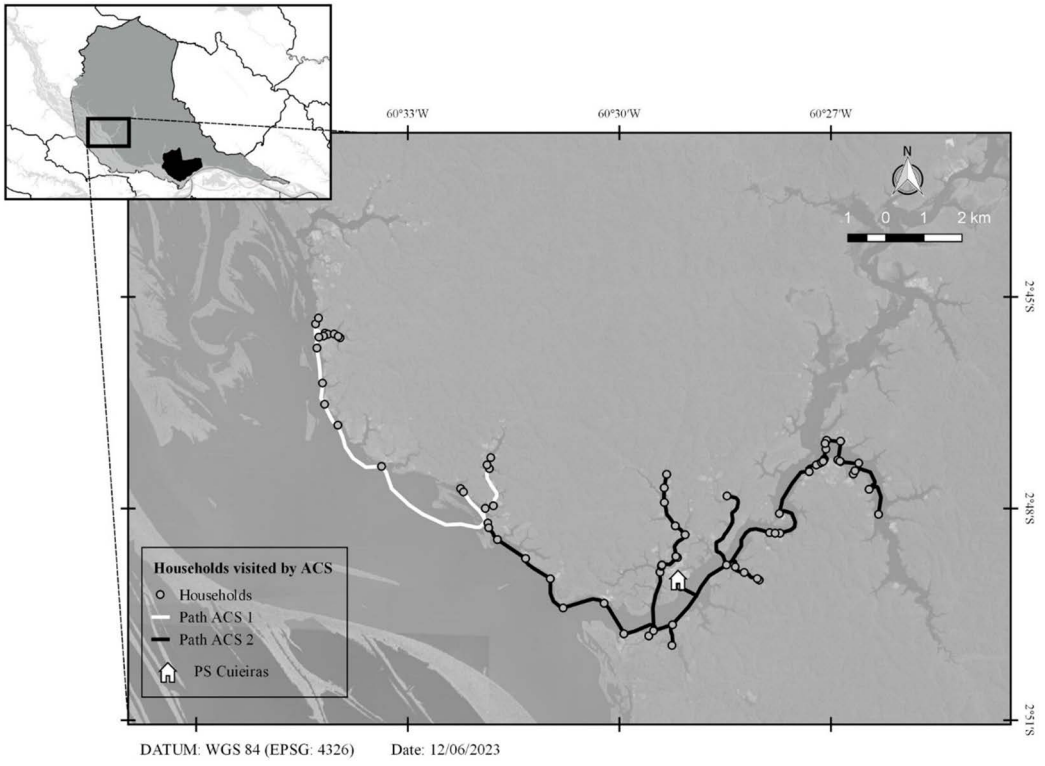
Based on the coordinates of the houses, the distance from the first home to the farthest house reached by each of the ACS was measured, not including the return trip. The result showed, , that ACS 1 travels a distance of 12.2 km e and ACS 2 travels a distance of, a 27.7 km (Figure 2).

In Cuieiras, the services do not have telehealth resources or other technological devices. In fact, the records of patients to be registered in the system are filled out manually in the community and then entered into the e-SUS by DISAR. Difficulties and inadequacies have also been reported in the functioning of the PS, which, according to them, runs out of water and energy for several days. The professionals who remain in the PS also resent the lack of materials to perform dressings, as well as other basic medicines, especially in the absence of UBSF professionals: "I think it should be law for us, that we have to be equipped for any care. But the caps were canceled, the needle to inject Benzetacil and penicillin also stopped coming" (Professional 6).

The professionals of the UBSF team admitted that they did not know Cuieiras well enough because of the short time they remain there and the large number of communities they have to serve. In addition, They also do not have time to learn about the local context with the ACSs and the PS director.

The professionals' statements suggest that they are dissatisfied with the support they receive from managers. According to their discourses, the managers do not visit rural areas and therefore do not know the reality they deal with. For professionals, this contact is necessary so that the differences in their actions could be taken into account in the planning and organization of health services. Another reason for dissatisfaction with managers is the fact that they only tell professionals what to do without involving them in the planning of actions, as of one of them: "In the last meeting now, managers met with the ACSs to go through what has already been defined. They never meet with us to build the proposal" (Professional 1). In addition, the findings suggest that they do not feel recognized for their efforts: "We are not seen, we do everything, but they never want to disclose it" (Professional 1).

Figure 2 – Households visited by ACS



Source: Prepared by the authors Data from the Brazilian Institute of Geography and Statistics (IBGE), Municipal Health Secretariat of Manaus (SEMSA) and Google Earth

Discussions

The immersion in the particularities of the provision of Primary Health Care (PHC) services in Cuieiras demonstrates that PNAB´s projection of the UBSF, alhtough an important step, is not sufficient to respond to the health needs of the local. In addition to this model, other strategies are needed to become the UBSF's performance more adequate and sustainable for rural riverrine areas.

One of the aspects that demonstrates this need for advances in the performance of the UBSF in Cuieiras is the lack of planning and adequacy of services to the reality of the territory, which is visible in the face of the little experience and little knowledge managers admit to have about rural areas. In addition, it is noteworthy that managers plan services according to the same strategies used for urban areas.

The need to adapt services to the place is a condition that has been explained in studies that address health services in rural and remote areas. According to Wakerman e Humphreys (2015), the service to be offered must be planned according to remoteness the local is and the number of people to be served, and it is necessary to evaluate which services would be more appropriate, such as preventive services, but also curative care, screening, specific exams and rehabilitation services.

The territorialization provided for in the PNAB would allow the adaptation to the differences that exist in the territories, however, its effectiveness in the country has been limited(Faria, 2020). This situation is aggravated by the difficulties and distortions in the ways of evaluating and monitoring the results of the implementations carried out in the functioning of the health services in Cuieiras.

The professionals also highlighted failures in the monitoring and support for the performance of actions by managers. A study carried out in rural South Africa (Versteeg; du Toit; Couper, 2013) emphasizes the need to train managers to

act in the recruitment and support of rural health professionals, and highlights the importance of an adequate plan for rural areas that includes equitable financing.

The fact that managers see the logistic investment and increased services as the main answers to act on the differences in the Amazonian region shows the limitations of these professionals' views since currently several innovations and resources are used as common strategies for health action in rural and remote areas and in different realities, among which the training of professionals to work in these places (Smith et al., 2015), the use of technology (Sahu et al., 2020), investments in ACS performance (Jerome; Ivers, 2010), the use of culturally appropriate approaches (Williamson; Harrison, 2010), among others. One strategy used by Latin American and Caribbean countries, including some Amazonian countries, has been investments in professionals – not necessarily doctors – present in rural and remote areas(Carpio; Bench, 2015).

UBSF professionals recognize that they do not have sufficient knowledge of Cuieiras and that their training is not sufficient to provide a more appropriate service. In addition, the knowledge that ACS have about the locality is not shared, and there is no exchange space between the professionals fixed in the locality and those working at the UBSF, which is an essential requirement for the operation of itinerant health services in remote areas (Carey et al., 2018).

The statements of the ACSs and the director of the PS reveal a sense of uncertainty regarding the procedures that must be adopted and disagreements regarding the needs of the work and what is recommended for it's implementation . It is noteworthy that the competencies of the PS service are not formally described, although it is a reference for people who live in these places and the only health service in operation throughout the month. The use of a flexible approach has been valued in rural and remote areas, however, professionals need to be clear about the scope with their work (Murray; Wronski, 2006). The inadequacies in their conduct, lack of a role description and low recognition have been pointed out as barriers to the development of PHC in rural and remote areas (Sbarouni et al., 2012).

Working in an itinerant service, such as UBSF, requires adaptations that must to be visible to the managers. Among them, the specificities of the Amazon geography, considering that the PNAB foresees that health units work with an enrolled territory, which is difficult given the reality of populations that are distributed in small nuclei or isolated houses over long distances and that usually migrate according to the period of drought or flood of the river. Another difference is the reduced time that the UBSF remains in the locality, wich requires these professionals to develop strategies for a periodic performance and evidencing the need for a design and the provision of specific guidelines for this model, which are not the same proposals for a traditional health service.

Another fundamental issue is the need for training and previous experiences of UBSF professionals focused on the Amazonian reality. The performance of these professionals in the face of cultural diversity requires them to develop skills and adopt an approach that allows them to perform qualified care. In addition, the low relevance that is given to ACS contrasts with their potential for action and contribution in rural and remote locations.

The results also show the lack of financial and structural resources that would allow a better quality service. The recognition of the distances covered by the ACS highlights the challenge of covering these distances alone in their small boats, which requirei adequate support for their activities.

The involvement of people served in the construction of the service is a strategy that has been adopted in rural and remote areas, aiming at the sustainability of the actions. However, the actions and statements of professionals and managers show the lack of participation of users and professionals in the entire planning process. Experience working in rural areas of Scotland demonstrates that community participation can lead to the design of new service models that fit existing budgets and meet local aspirations and health priorities (Farmer; Nimegeer, 2014).

Final considerations

The analysis of the implementation of the UBSF in Cuieiras allowed an in-depth view of the key elements that directly or indirectly related to PHC services performed in the locality. This knowledge made it possible to explore aspects that interfere with health services, with the potential to subsidize the organization and offer of services so that they are sensitive to the inequities present in this context.

In this sense, it is noted that the improvement of the UBSF requires strategies that ideally should involve the effort of the three government spheres, since they imply measures that involve cooperation and innovations essential for the guarantee of health in the Amazon region, such as the implementation of technologies and the training of personnel.

However, the paths for the improve and implement this model, must be conducted based on a collective construction, involving the local professionals and the users, as well as being the result of adequate monitoring and evaluation, these being the conditions for them to be more qualified and sustainable.

It is also noteworthy that the financing and structure available to carry out the actions in Cuieiras, identified as problematic, must be a priority given the reduction of investments in health that occurred in the country and the unequal distribution of financial resources and conditions of vulnerability that exist in the Amazon.

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Authors' contributions

Sousa and Bousquat were responsible for the study design and planning. Sousa, Fonseca and Bouquat performed the stages of data analysis, text production, revision and approval of the final version.

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