

Popular use of medicinal plants in the municipality of Tefé, Amazonas, Brazil.

Uso popular de plantas medicinais no município de Tefé, Amazonas, Brasil.

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Abstract

Medicinal plants are natural products used since ancient times, and the knowledge regarding their properties and use is transferred from one generation to the next. Many people continue to consume this natural product, which has made this means of treatment relevant in the eyes of researchers. The search for this learning using the collection of information as a source is increasingly growing, thus allowing to study their properties, their therapeutic powers, and active principles. For this reason, this work aimed to collect, analyze and record information about the level of knowledge of the population about pre-established medicinal plants, their origin, the form of use and the pharmacological effects of these species cultivated in the municipality of Tefé-Amazonas, Brazil. The collection of information took place through an interview, which contained questions regarding the plants: pobre-velho (*Costus spicatus*), escada de jabuti (*Bauhinia rutilans*), mucuracaá (*Petiveira alliacea*), sucuuba (*Himatantuhus sucuuba*) and panquelé (*Piper amapens*). The data collected had satisfactory results where it was observed that a large part of the population knows and makes use of the plants mentioned and often the same plant is used for different pathologies. Another relevant point is that some plants are known with different names, and many people did not recognize them by the names mentioned, which made the answers of the interviews inaccurate at times, however, did not compromise the results. Therefore, the knowledge of the population has great relevance for the enrichment of knowledge about natural products, where many scholars are able to discover and develop products that are essential for curing, treating or preventing diseases that are often referred to as irremediable.

Keywords: Medicinal plants; Therapeutic use; Amazon.

Resumo

As plantas medicinais são produtos naturais utilizados desde a antiguidade, e o conhecimento referente à suas propriedades e utilização são transferidas de uma geração para a outra. Muitas pessoas continuam consumindo esse produto natural, o que tornou esse meio de tratamento relevante aos olhos dos pesquisadores. A busca por esse aprendizado utilizando como fonte a coleta de informações é cada vez mais crescente, permitindo assim, estudar as suas propriedades, seus poderes terapêuticos e princípios ativos. Por esse motivo esse trabalho teve como objetivo coletar, analisar e registrar informações sobre o nível de conhecimento da população sobre as plantas medicinais pré-estabelecidas, sua procedência, a forma de uso e os efeitos farmacológicos dessas espécies cultivadas no município de Tefé – Amazonas, Brasil. A coleta de informação se deu por meio de uma pesquisa de opinião, na qual continha perguntas referentes às plantas: pobre-velho (*Costus spicatus*), escada de jabuti (*Bauhinia rutilans*), mucuracaá (*Petiveira alliacea*), sucuuba (*Himatantuhs sucuuba*) e panquelé (*Piper amapens*). Os dados coletados tiveram resultados satisfatórios onde se observou que grande parte da população conhece e faz uso das plantas citadas e, muitas vezes, a mesma planta é utilizada para patologias diferentes. Outro ponto relevante é que algumas plantas são conhecidas com nomes diferentes, e muitas pessoas não reconheciam pelos nomes citados, o que tornou as respostas das entrevistas inexatas em alguns momentos. Contudo, não comprometeu os resultados. Portanto, o conhecimento da população tem uma grande relevância para o enriquecimento do saber sobre os produtos naturais, onde muitos estudiosos conseguem descobrir e desenvolver produtos que são essenciais para cura, tratamento ou prevenção de doenças que muitas vezes são referidas como irremediáveis.

Palavras-chave: Plantas medicinais; Uso terapêutico; Amazônia.

Resumen

Las plantas medicinales son productos naturales utilizados desde la antigüedad, y el conocimiento sobre sus propiedades y uso se transmite de generación en generación. Un gran número de personas sigue consumiendo este producto natural, lo que ha hecho que este medio de tratamiento sea relevante a los ojos de los investigadores. La búsqueda de este aprendizaje utilizando la recopilación de información como fuente es cada vez más creciente, permitiendo así estudiar sus propiedades, sus poderes terapéuticos y principios activos. Por ello, este trabajo tuvo como objetivo recopilar, analizar y registrar información sobre el nivel de conocimiento de la población sobre las plantas medicinales preestablecidas, su origen, la forma de uso y los efectos farmacológicos de estas especies cultivadas en el municipio de Tefé- Amazonas, Brasil. La recolección de información se realizó a través de una encuesta de opinión, que contenía preguntas sobre las plantas: pobre-velho (*Costus spicatus*), escada de jabuti (*Bauhinia rutilans*), mucuracaá (*Petiveira alliacea*), sucuuba (*Himatantuhs sucuuba*) y panquelé (*Piper amapens*). Los datos recolectados tuvieron resultados satisfactorios donde se observó que gran parte de la población conoce y hace uso de las plantas mencionadas y muchas veces se utiliza la misma planta para diferentes patologías. Otro punto relevante es que algunas plantas son conocidas con diferentes nombres, y muchas personas no las reconocieron por los nombres mencionados, lo que hizo que las respuestas de las entrevistas fueran en ocasiones inexatas, sin embargo, no comprometió los resultados. Por lo tanto, el conocimiento de la población tiene gran relevancia para el enriquecimiento del conocimiento sobre los productos naturales, donde muchos estudiosos son capaces de descubrir y desarrollar productos que son esenciales para curar, tratar o prevenir enfermedades que muchas veces se denominan irremediables.

Palabras clave: Plantas medicinales; Uso terapeutico; Amazonas.

1. Introduction

The use of plants for medicinal application has been carried out since the beginning when primitive man depended on nature's resources for his survival and healing, so they were one of the main means for these ends (Weyrich, et al., 2017; Almeida, 2011). Medicinal plants are so called because they have active principles that help in the therapeutic process of curing diseases. They can be found both in nature and on small family farms. Knowledge about the use of these plants is always passed from generation to generation. However, it is necessary to know about the therapeutic principles due to these organisms, since many can be harmful to health, depending on their origin, method of preparation, and lack of knowledge of their pharmacological actions (Silveira & Bassan, 2021; Shirabayashi et al., 2021).

Among the areas of study, there is ethnobotany, which analyzes the subsisting relationship between man and plants in a dynamic way, through the uses of medicinal plants given by the ancient population that did not have access to drugs (Monteiro & Brandelli, 2017). Another area responsible for studying the use of medicinal plants is ethnopharmacology which, contrary to what many people believe, does not refer to popular superstitions, but the knowledge acquired by the population through traditional knowledge. In addition, this has a great contribution to the discovery of new phytochemical compounds

with pharmacological properties, providing relevant aspects about the precaution in the use of medicines extracted from nature (Elisabetsky, 2003; Pio et al., 2018).

The Amazon is the largest biodiversity database on the planet. Consequently, it is where the great mass of medicinal plants is located, sheltering a vast amount of indigenous peoples and traditional populations that acquired over time knowledge about how to live in different environments and how to make use of each plant (Carvalho, 2019). The extraction of forest resources is a very common activity in the municipalities of Amazonas, including the municipality of Tefé, which contains about 59,250 inhabitants (IBGE, 2021). In this city, family farming is the most used economic activity, in addition to fishing and hunting (Gomes, 2018). Even with the advancement of the health system, there is still a lot of difficulty in receiving good care in hospital units, due to the lack of trained professionals, materials, structures, and the difficulty of moving from neighboring communities to the Basic Health Unit (UBS) or hospital. In addition, most of the population of Tefé has a low income, which makes it impossible to buy medicines in drugstores/pharmacies (Queiroz, 2019).

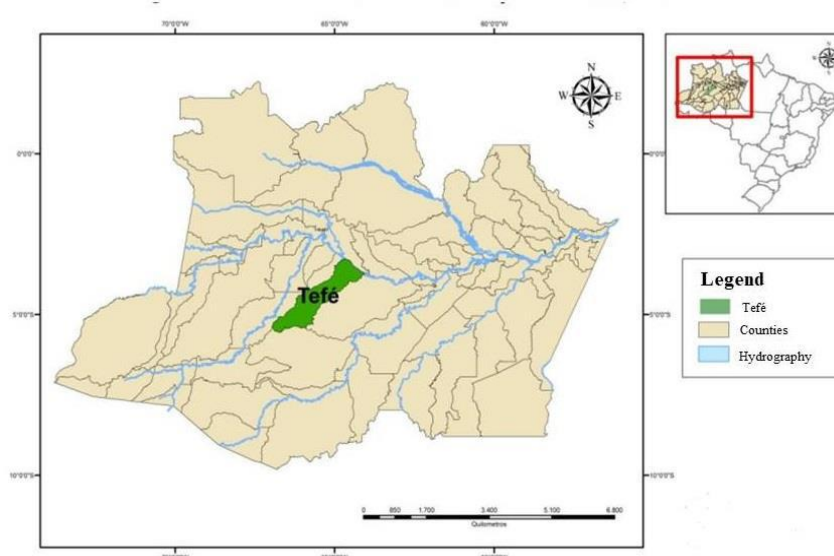
For these reasons, the population seeks other means of obtaining treatment for their illnesses, such as, for example, medicinal plants that are part of the culture of many family members, where they exchange pharmacological medicines for teas, bottles, syrups, and baths made with these plants, which stimulates the study of the relationship between the population and nature (SEDECTI & SECTI, 2021). With this concept in mind, this work aimed to collect, analyze, and record information about the population's level of knowledge about the plants studied: origin, use, and the pharmacological effects of these species cultivated in the municipality of Tefé - Amazonas, Brazil.

2. Methodology

2.1 Study area

The opinion poll was carried out in the municipality of Tefé, which is located in the physiographic region of Solimões-Tefé. This is one of the most central municipalities in the state of Amazonas (Figure 1), with the headquarters (Tefé) located on the right bank, in the mouth/east direction, of Lake Tefé (Sousa, 1989). Due to its location close to the confluence of the Japurá and Juruá rivers with the Solimões river and being a little distant from the Jutai river, Tefé is characterized as a supply depot in river arteries, having great importance for the distribution of products and the circulation of people (Santos, 2012; Sousa, 1989).

Figure 1 - Location of the study area Municipality of Tefé - Amazonas, Brazil.



Base font: Rodrigues (2011).

Tefé has a territorial area of 23,692.223 km² and, according to the Brazilian Institute of Geography and Statistics (IBGE, 2021), the population present in the last census carried out in 2010 was 61,453 people. However, it is estimated that in the 2021 was approximately 59,250 inhabitants.

The city monopolizes important public services that serve the inhabitants of the city, the rural population, and neighboring municipalities. The economic income of the urban population is through commerce, where retail and wholesale stores, bank agencies, hotels, and supermarkets are present. In the primary sector, the main income comes from agriculture, followed by livestock, fishing, and plant extraction (IDSMS, 2022; Gomes, 2018).

The city has two public hospitals and health posts in several neighborhoods. According to the IBGE, there are 26 municipal health establishments and five private ones. It also has universities: Amazonas State University (UEA) and Federal Institute of Education of Amazonas (IFAM), in addition to private universities. The capital of Amazonas, Manaus, is 521 km away from Tefé, where both can be accessed by flights, boats, and speedboats. These types of transport, including canoeing, are also used by the population and neighboring communities of the municipality of Tefé to access other cities and municipalities (IDSMS, 2022).

2.2 Data Collection and Analysis

The work began in March 2021 in the city of Tefé-AM with the choice of medicinal plants that would be used to carry out the research through works reported in the literature. The selected plants were: pobre-velho (*Costus spicatus*), escada de jabuti (*Bauhinia rutilans*), mucuracaá (*Petiveira alliacea*), sucuuba (*Himatantuhu succuuba*), and panquelé (*Piper amapens*).

In the second stage, the questionnaire for opinion research was produced, containing objective and essay questions regarding the selected medicinal plants (Table 1). The research took place voluntarily, the elements were people aged between 22 and 66 years old, all of whom were residents of the city of Tefé. The questionnaire was applied by the scholarship students and they were carried out in public places, such as the municipal fair of Tefé, streets, and the Regional Hospital of Tefé Carlos Braga for the employees and in some residences that were selected by the interviewers. After the conclusion of the interview, all the data collected were stored and transferred to an electronic spreadsheet, to later carry out the production of graphs and analysis of the results. The resource used to transfer the data to the spreadsheet was Google Forms.

Table 1 - Interview questions.

Number	Questions	Points covered
1	What is your name?	Profile of respondents
2	How old are you?	
3	Have you ever heard about these medicinal plants?	
4	Have you ever used these plants?	Popular knowledge
5	What do you think they are for?	
6	How did you use this plant?	
7	What other name do you know this plant by?	
8	What is your opinion about medicinal plants?	
9	What medicinal plants do you use often?	
10	Do you have any plants in your home that have medicinal properties? If yes, which ones?	Indication of use
11	Have you ever recommended a medicinal plant to someone else?	
12	Have you ever exchanged a drug for a plant with medicinal properties?	

Base font: Adapted from Silva et al., (2021).

3. Results and discussions

3.1 Respondentes Profiles

The age range of the interview participants was 22 to 66 years (the approximate age of the oldest participant according to the questionnaire). Of the 200 participants interviewed, 61% were women and 39% had a mean age of 37.94 years for men and 35.43 years for women (Table 2).

Table 2 - Number of respondents by gender and age of residents of the city of Tefé – Amazonas.

Gender	Number	Age (Years)		
		Average	Min.	Máx.
Male	78	37.94	24	55
Female	122	35.43	22	66
Total	200	36.68	22	66

Source: Authors (2022).

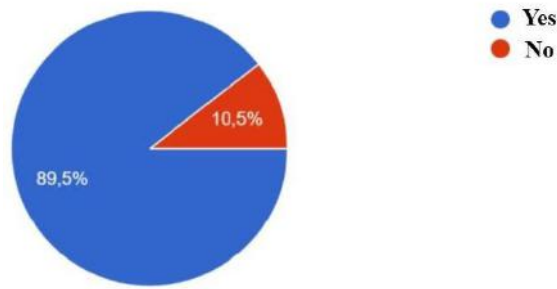
Most of the respondents belong to the female gender. It is inferred that this result is due to the fact that the interview was carried out in public places such as the municipal fair of Tefé, where the interviews were concentrated, and which are usually frequented by women. Generally, those who carry out the sales and purchases of products are women since the husbands are responsible for collecting products for sale. The fact that there were a greater number of women at the fair corroborates the data from IDSM (2013), where during their interview with 55 fair traders, 58% were female, in addition, Scalco et al. (2012) in their research carried out in two fairs, found that most of the visitors to these places are women.

The level of education was not used as a criterion for classifying people to answer this research, as it is about traditional knowledge that is transmitted through orality from generation to generation. According to Pires et al. (2014), the use of medicinal plants is similar between illiterates and those with a high level of education, that is, even though many people do not have education through schools, they can obtain knowledge regarding the use of medicinal plants. Tuler (2011) shows that people who have a low level of education have deeper knowledge regarding the use of medicinal plants because they are restricted from using these means for the treatment and cure of diseases due to a lack of access to specific medicines.

3.2 Identification, diseases, and use of medicinal plants

According to the research carried out, the plants chosen are widely used and known by the population of Tefé, where 89.5% have already heard about the plants: pobre-velho (*Costus spicatus*), escada de jabuti (*Bauhinia rutilans*), mucuracaá (*Petiveira alliacea*), sucuuba (*Himatantubs sucuuba*), and panquelé (*Piper amapens*). Only 10.5% of respondents have never heard about these plants (Figure 2). Such plants were also mentioned by Queiroz (2019) in a work carried out within the Tefé National Forest, by Leal (2019) in São Gabriel da Cachoeira, and by Silva et al. (2022) in a study carried out in the municipality of Tefé-AM, which shows us the scope of these plants in the Amazon Region. Pasa (2011) claims that knowledge about local medicinal plants and their use is not always fully known by all members of a community.

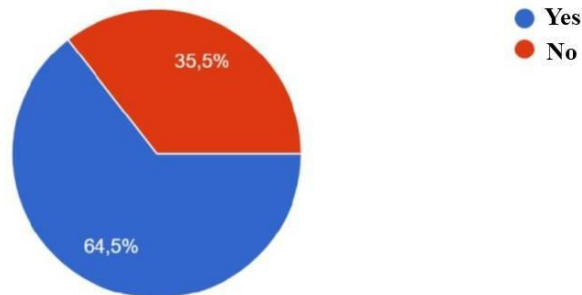
Figure 2 - Percentage of people interviewed who have heard about or know about the studied medicinal plants.



Source: Authors (2022).

Regarding the number of people who use the plants of interest in this research, 64.5% of respondents report that they have used or use them and 35.5% reported that they have never used them (Figure 3). Silva et al. (2019) in an interview carried out in the Quilombola community of Abacatal, asked their interviewees about the knowledge of the use of medicinal plants by a family member and found that 92.9% of the interviewees had family members who used them and 7.1% answered negatively. These results confirm what Scudeller (2009) presents in his work, in which he reports that in the Amazon there is a great cultural richness native to the local populations and the use of medicinal plants is quite common. Generally, people who use these natural products received guidance and acquired knowledge through their ancestors or more experienced people. Other factors that induce the use of medicinal plants are the high cost of synthetic drugs, in addition to their accessibility in the region (Amorozo, 2002). Validating this, Sales et al. (2009) report that medicinal plants are used by populations due to cultural heritage and accumulation of knowledge through the knowledge acquired regarding the use of natural resources over the years.

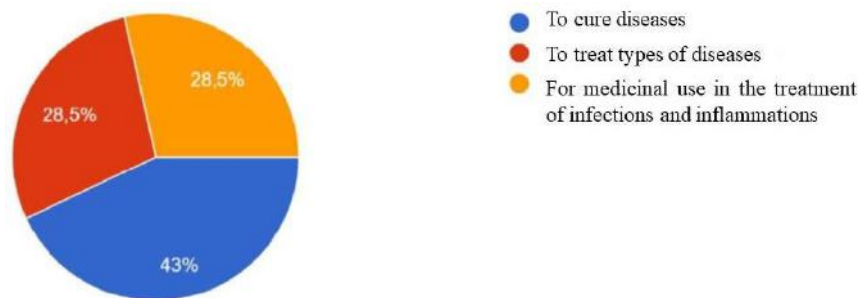
Figure 3 - Percentage of people who have already used the medicinal plants mentioned in this research.



Source: Authors (2022).

During the interview, they were asked about its usefulness and 43% said that it is used to cure diseases, 28.5% for medicinal use in the treatment of infections and inflammation, and 28.5% to treat other types of diseases (Figure 4). In the work carried out by Silva et al. (2022) the participants of their interview reported that medicinal plants are used for the treatment of diseases such as stomach pains, flu, and general inflammation, with 13.1, 12.8, and 10.3%, respectively.

Figure 4 - Answers about the medicinal utility of the species in this research.



Source: Authors (2022).

Regarding the diseases for which each plant is used, we made a table containing: scientific name, popular name, part used by the population, preparation method, and its main uses (Table 3).

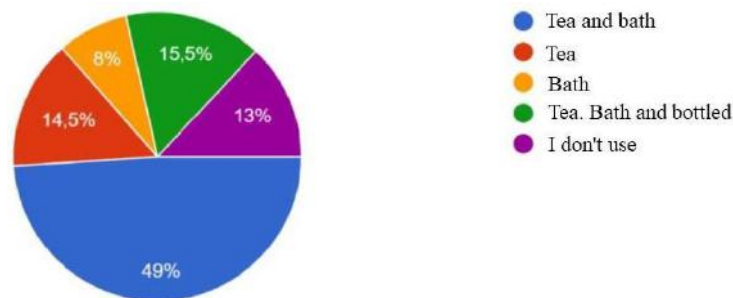
Table 3 - Traditional use of medicinal plants used in the research.

Scientific name	Popular name	Plant part	Preparation method	Target disease
<i>Costus spicatus</i>	Pobre-velho	Leaves	Tea	Kidneys, liver, and urine pain.
<i>Bauhinia rutilans</i>	Escada de Jabuti	Stem bark	Maceration (int.), tea	Stomach pain, and diarrhea.
<i>Petiveria alliacea L.</i>	Mucuracaá	Leaves, roots	Bath tea, tea, syrup, juice (int.)	Child bath, headache, flu, and fever.
<i>Himatanthus sucuuba</i>	Sucuuba	Stem bark	Tea, bath tea	Bath for women, stomach ache, and urine pain.
<i>Piper amapens</i>	Panquelé, elixir-paregórico, hortelã	Leaves	Tea	Stomach ache, colic, fever, and constipation.

Source: Authors (2022).

The method of preparation for the application of the plants is essential to obtain the desired effect and, for this reason, the interviewees were asked how they used them and the result was that 49% use them in the form of tea, and tea bath, 15.5% tea, bath and infusion in bottle, 14.5% use only as tea, 13% reported that they do not use the plants mentioned, and 8% use it only as a tea bath (Figure 5). Corroborating these results, Vásquez et al. (2014) observed that 62.2% of their respondents used medicinal plants in teas. In the research by Queiroz (2019), the most cited form of preparation was also tea, obtaining a total of 86 citations, followed by infusion in bottle with 34 and macerated with 20 citations. In the work by Silva et al. (2022), respondents reported that the most used method for the preparation of medicines with medicinal plants is in the form of tea (61.1%), followed by tea bath (8.5%), syrup (6%), submerged in water (5.1%), and juice (4.8%).

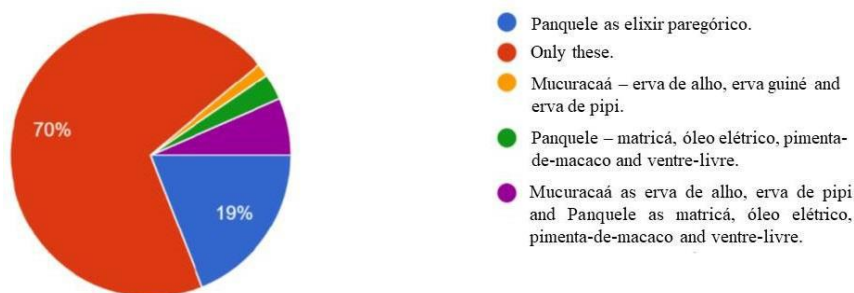
Figure 5 - Methods of preparing plants for use by the population.



Source: Authors (2022).

Because these plants are quite common in the municipality of Tefé, when we asked what other names the population knew these plants by, 70% reported knowing them only by the names mentioned, 19% knew the panquele as elixir parigórico, but other names were also mentioned: matricá, óleo-elétrico, pimenta-de-macaco, and ventre-livre. 11% differed only with mucuracaá names: erva de alho, erva de guiné, and erva pipi (Figure 6). Most of the respondents knew the panquele only as elixir parigórico, making it difficult to answer the other questions in the questionnaire, but after detecting this, at the time of the interview, both names were used to identify the plant by the population. Pinto (2008) reiterates that one of the great difficulties to expand the knowledge about medicinal plants is their popular name, since many are different from one place to another, for this reason, to have reliability when collecting data and information. The scientific name can be used, however, these are not known by society.

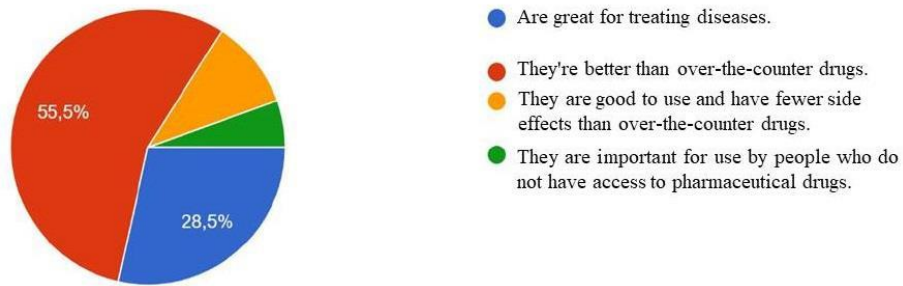
Figure 6 - Names by which the research plants are known in Tefé –Amazonas, Brazil.



Source: Authors (2022).

When asked about the efficiency of medicinal plants, 55.5% of the participants think that they are better than pharmaceutical remedies, 28.5% reported that they are great for use in the treatment of diseases and 16% were divided in the opinions that are good to use and have less side effect than pharmaceutical drugs and are important for the use of people who do not have access to pharmacy drugs (Figure 7). In the work developed by Silva et al., (2019), among 70 participants, 45 reported that they consider medicinal plants to be more effective than pharmacy remedies, 6 said they are no longer effective, 15 did not know how to respond and 4 do not use them. It was found in the obtained data that there is always a comparison between natural and synthetic products. Generally, this comparison occurs due to the experience that the person has with the plant, with the effects that it presents or because it is a natural product and, consequently, is considered less aggressive.

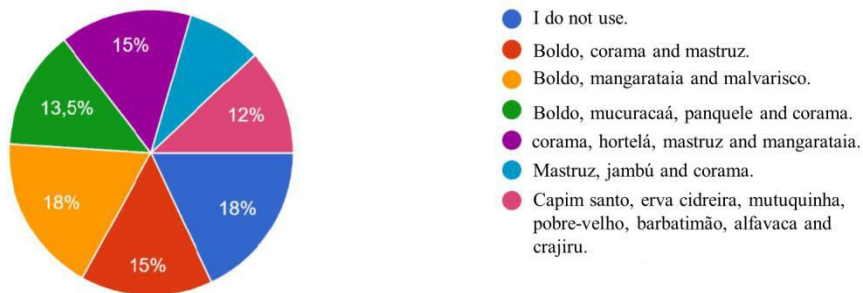
Figure 7 - Opinion of respondents concerning medicinal plants.



Source: Authors (2022).

Regarding the question about which medicinal plants the participants used: 18% answered that they did not use them, 18% used boldo, mangarataia (ginger), and malvarisco; 15% boldo, corama, and mastruz; 15% used corama, mint, mastruz, and mangarataia; 13.5% boldo, mucuracaá, panquelé and corama; 12% capim santo (lemongrass), erva-cidreira (lemon balm), mutuquinha, pobre-velho, barbatimão, alfavaca, and crajiru; and 8.5% mastruz, jambú, and corama (Figure 8). As we can see, one of the plants most cited by the population is boldo, this result is similar to the research by Silva et. al. (2019), where 65.7% of respondents cited this medicinal plant as the most used in the region of Abacatal, Ananindeua (PA), other plants that were also mentioned were the paregórico/panquelé elixir (17.1%), alfavaca (18.6%), mucuracaá (18.6%), and capim santo (20%). Brasileiro et al. (2008) in their work carried out in Governador Valadares - Minas Gerais, Brazil, observed that boldo was the second most used plant and erva cidreira the first one. Mint and cana-de-macaco/pobre-velho were also presented as the most used medicinal plants.

Figure 8 - Most used medicinal plants by Tefé population.



Source: Authors (2022).

When asked if they had plants with medicinal properties in their homes, 36.5% of respondents reported that they did not, while 63.5% said they had (Figure 9). This fact was also confirmed by Silva et al. (2022), where 47% of the residents of Santa Tereza, a neighborhood in the city of Tefé, did not cultivate. Similarly, Pedrollo et al. (2016) in a study carried out in communities on the Jauaperi river, between the states of Amazonas and Roraima, reported that 63% of respondents did not cultivate medicinal plants. This fact is justified by the fact that the Amazonian culture is quite extractive, in which instead of cultivating, the population obtains the products through nature. Among the people who cultivated, 17.5% cultivated mucuracaá, boldo, and corama, 12.5% mangarataia, mucuracaá, corama and quebra-pedra, 6% pobre-velho, mangarataia, and boldo. The others were divided in the cultivation of arruda (rue), capim santo, erva cidreira, malvarisco, sara-tudo, algodão roxo, panquelé and mint (Figure 9). It is worth noting that the plants that are normally cultivated by the population are the most used also because of the ease of access to them.

As previously described 63.5% of respondents cultivate some medicinal plant in their homes (Figure 9), a fact also confirmed by de Marçal et al. (2003), in Goioerê, a municipality located in the interior of Paraná (southern Brazil), where 66% cultivated certain species of medicinal plant in their backyards. In the municipality of Porto Alegre - Rio Grande do Sul (also southern Brazil), 86.2% of the population of the Ponta Grossa neighborhood reported that they planted medicinal plants (Vendruscolo & Mentz, 2006). In an interview carried out by Cassino (2010) in floodplain communities of the Solimões-Amazonas River -Brazil, 70.5% of the medicinal species mentioned by the participants were cultivated in the region.

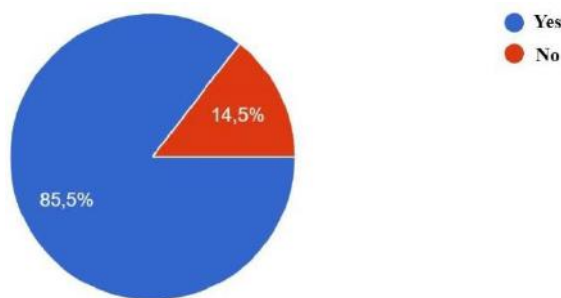
Figure 9 - Medicinal plants most used by the population of Tefé – Amazonas, Brazil.



Source: Authors (2022).

Self-medication with medicinal plants occurs mainly at the recommendation of close people. This event is verified when we asked the participants if they had already recommended medicinal plants to someone else, the result obtained was 85.5% said yes and 14.5% said no (Figure 10). This result is in agreement with what was described by Ribeiro et al. (2020), where 88% of their respondents reported indicating medicinal plants. In this same context, Silva et al. (2010) observed that 94.2% of respondents indicated the use of medicinal plants.

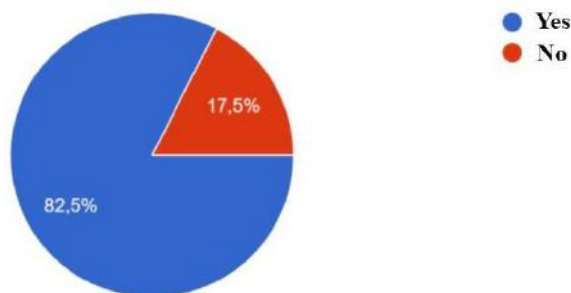
Figure 10 - Indication of medicinal plants for other people.



Source: Authors (2022).

Regarding the replacement of synthetic drugs by plants with medicinal properties, most respondents said they did (Figure 11). People who use medicinal plants believe that they are less aggressive to the body and that they do not have adverse reactions. However, this information may be wrong, as several plants that do not have a study on their toxic profile, which can cause damage to health. These reactions are related to the chemical constitution and can cause intoxications and allergies (Silveira et al., 2008).

Figure 11 - Percentage of people who replace synthetic drugs with medicinal plants.



Source: Authors (2022).

4. Conclusions

Medicinal plants are very present in the lives of residents of the municipality of Tefé-Amazonas, Brazil. Most of them use these plants as medicine and believe in their therapeutic powers to cure, treat, and prevent diseases, and, even with the improvement of health in the community and the ease of acquiring pharmacological medicines, many residents choose to use the products as the first option for the cure of their illnesses.

It is important to report that a great knowledge of the population on medicinal plants was presented even in the groups under 40 years of age, which is inferred in the process of passing of knowledge from the old generation to the current one. Therefore, there is a great contribution so that this understanding of the use, method, not fall into oblivion, through it, new studies may emerge to disseminate and prove the beneficial effects of these plants.

Thus, the knowledge of the population has a great contribution to the enrichment of knowledge about natural products, where many researcher are able to discover and create products that are essential for curing, treating, or preventing diseases that are often referred to as irremediable. Another important factor for the continuation of studies on medicinal plants is that many can treat a disease. However, they can cause intoxications or some undesirable reactions, since there is no complete knowledge about the ethnopharmacological and phytochemical properties of many plants used by the population.

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