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(RESEARCH ARTICLE)



Medicinal plants used in the public health system of Abaetetuba, in the Brazilian Amazon

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Abstract

We investigated the medicinal plants used by patients frequenting the public health system of Abaetetuba, in Pará State, in the Brazilian Amazon, and analyzed their socio-economic profile, recorded the habits and origins of those plant species, and conferred which are cited in the National List of Medicinal Plants of Interest to the Unified Health System (acronym – RENISUS). A total of 1089 questionnaires were applied during interviews held by 40 community health workers. The Flora do Brasil 2020 website was consulted to identify the habits and origins of the medicinal species. The Unified Health System of the Ministry of Health website was consulted to confirm the inclusion of those species of interest. Most users of medicinal plants were between 21 and 30 years of age (13%), and were predominantly women (60.23%) employed as maids. Forty-one species of medicinal plants were identified; the plants most familiar to users were "boldo" [*Vernonia condensata* Baker.], "cidreira" [*Lippia alba* (Mill.) N.E. Br.], "jucá" (*Caesalpinia ferrea* Mart), "hortelã" (*Mentha* sp.), "limão" [*Citrus limon* (L.) Burm.], "sicurijú" (*Mikania lindleyana* DC.), "barbatimão" (*Stryphnodendron barbatimam* Mart.), "marupazinho" [*Eleutherine bulbosa* (Mill.)], "anador" or "sete dores" (*Plectranthus barbatus* Andrews), and "erva doce" (*Pimpinella anisum* L.). *Vernonia condensata* is considered a plant of interest to the Brazilian health system, and represents the principal focus of this research.

Keywords: Ethnobotany; Public health; Phytopharmaceuticals; Folk medicine

1. Introduction

The Amazon region is rich in biological and cultural diversity, and its natural resources are widely used by local human populations [1]. Medicinal plants are one of the principal means of treating diseases there, especially in light of the high costs of commercial medicines [2].

The Brazilian National Policy for Medicinal and Herbal Plants and the National Policy for Integrative and Complementary Practices was created in 2006 to enrich discussions concerning opportunities their use, and the importance, advantages, and effectiveness of phytotherapies the public health system, as well as the difficulties their incorporation face [3].

Community health workers represent the first line of health teams in contact with local residents through home visits. The relationships of those professionals with their communities is of paramount importance, as they occupy the space in which the therapeutic uses of medicinal plants are discussed [4].

Several projects carried out in Abaetetuba have shown interest in studying the medicinal plants used by different communities there (including riverine communities [5] and remnants of traditional black settlements – "quilombos") [6] [7]. The species cultivated in home gardens have also been researched [8] [9] [10], as well as herbal practices in

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urban areas [11]. The city presents itself as a promising source of ethnobotanical knowledge, especially as concerns the fields of public health and popular medicine.

The present study investigated the medicinal plants known and used by patients registered with the public health system of Abaetetuba, and also analyzed the socio-economic profiles of the informants; verified the habits and origins of the plant species they used, cross-referenced them with those cited in the National List of Medicinal Plants of Interest to the Unified Health System (Brazilian acronym – RENISUS), as well as listed relevant aspects of the importance of their uses – thus presenting a systematization of local folk knowledge that can contribute to the documentation and enhancement of popular medicinal practices.

2. Material and methods

2.1. Study area

The municipality of Abaetetuba in Pará State, is situated in the Brazilian Amazon, and covers 1,611 km² with approximately 140,000 inhabitants [12]. The vegetation there is typically Amazonian, but also now largely composed of secondary forests interspersed with agricultural areas [12]. The hydrographic network in the municipality is quite vast, with several large rivers [13].

The city is divided into an urban area with 16 neighborhoods, and a rural area comprising 20 islands and 49 locations (the latter mostly along roads, with fewer located in transition areas between the roads and the islands) [14].

The municipality has 54 public health posts, which were established according to local needs [14] The present study investigated three health posts in the urban area of Abaetetuba, and one in a rural site (Figure 1).

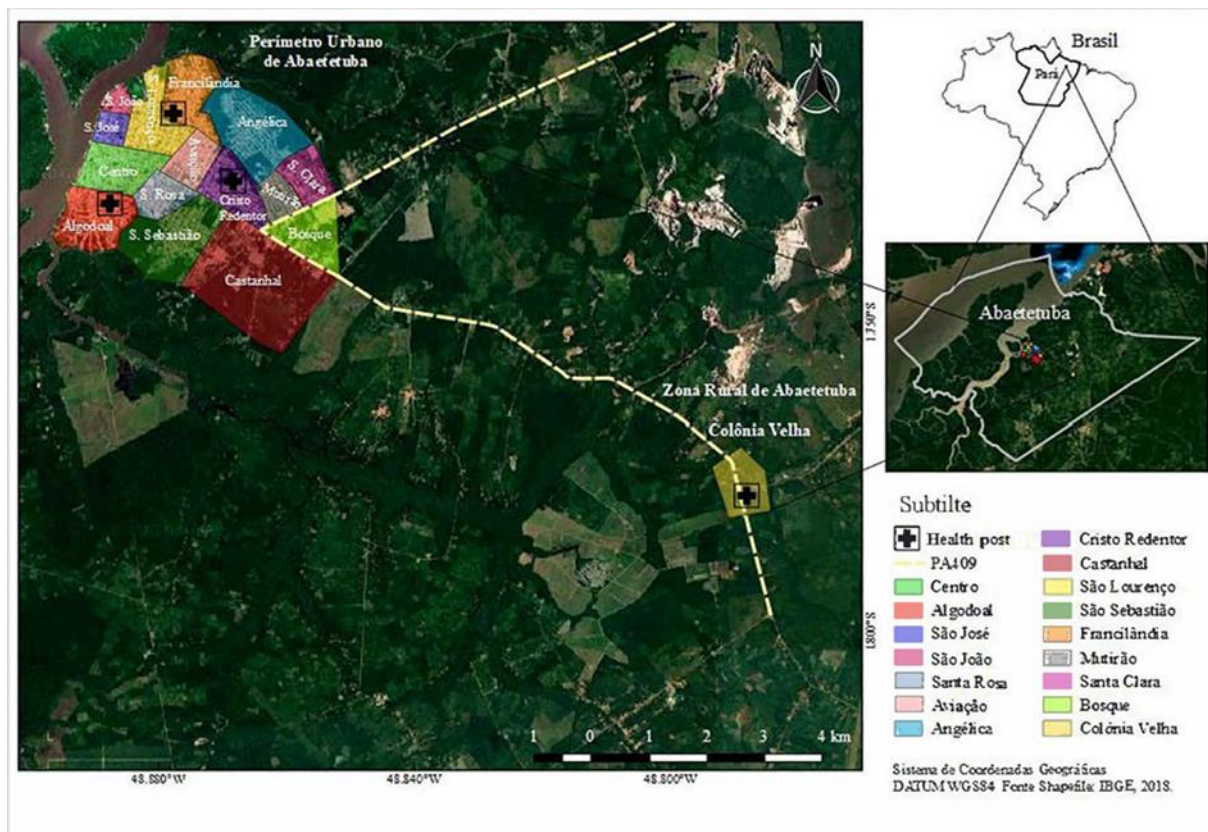


Figure 1 Locations of the Health Services investigated.

2.2. Ethical procedures

This research was registered on the Platform of the National System for the Management of Genetic Heritage and Associated Traditional Knowledge (Brazilian acronym – SisGen) under registration number A1C6307.

2.3. Collection and analysis of ethnobotanical data

We examined 1089 questionnaires that had been applied by 40 community health agents among the local population, analyzed the socioeconomic profiles of citizens registered in the public health system, and determined which medicinal plants were used by them. The most representative botanical families were quantified in terms of their numbers of species. The most cited plants represent the “cultural salience” among informants, based on the free-listing method [15]. We selected ten of the most cited species to conduct a literature search. The Flora do Brasil 2020 site [Flora do Brasil 2020, under construction. Jardim Botânico do Rio de Janeiro, <http://floradobrasil.jbrj.gov.br/>., accessed on: 15 jun. 2019] was consulted to identify the habits and origins of the species. The criteria used were: Exotic – species not native to the Amazon phytogeographic domain; and, Native – native species. To determine if the species are of interest to the Brazilian public health system, we consulted the Ministry of Health website [http://bvsm.sau.gov.br/bvs/sus/pdf/marco/ms_relacao_plantas_medicinai_sus_0603.pdf., accessed on: 15 jun. 2019].

Visits were made to the neighborhoods where the health posts were located. We used the snowball technique, followed by guided tours [15]. After collection, the plant material was herborized according to standard techniques [16].

The popular names cited in the questionnaires were investigated and identified by herbarium searches. The collected plants were identified by consulting the specialized literature on medicinal plants [1]. Botanical families were circumscribed according to the 2016 classification system of the Angiosperm Phylogeny Group.

3. Results and discussion

The questionnaires revealed that 171 (15.7%) informants used medicinal plants, while 150 (13.7%) did not; 768 (70.5%) health records contained incomplete information about the possible use of medicinal plants. The existence of health records with incomplete information reinforces the importance of professional training for community health workers. The performances of those professionals reflect on the principles of the Brazilian public health system, which are essential for an effective and adequate understanding of the system [17].

The citizens with health records registered in the public health system, and who most resorted to the use of medicinal plants, were between 21 and 30 years-old, representing 13% of the sample, followed by the 31 to 40-year-old age group (11.5%).

Women were the most representative informants (103 participants, or 60.23%), while men composed 39.76% of the sample (68 participants). People close to 30 years old were most willing to provide information about the use of medicinal plants, while younger people generally preferred commercial chemical remedies [18].

Women were most likely to use medicinal plants, as they are largely responsible for family health care [19].

Of the citizens registered in the public health system, 56.14% (96 people) have only a primary level of education, followed by high school level 22.22% (38 people), and higher education 2.92% (5); no information was available for 14.61% (25); the predominance of informants with only primary levels of education has likewise been reported in similar studies [20] [4], which reflects easy access to those treatments and their low costs [21].

A majority of the informants were housewives (as was also reported for the basic health units in Colombo in Paraná State, Brazil) [22], which reflects their traditional knowledge about natural medicines, and the roles of women within their families and society [23].

The users of medicinal plants (and who are registered in the public health system) reported the names of 41 plants distributed among 27 families. Thirty-seven plants were identified to the species level, three to the genus level ["hortelã" (*Mentha* sp.), "hortelãzinho" (*Mentha* sp.), and "verônica" (*Dalbergia* sp.)], and one only to the family level ("salva", Asteraceae). The families Asteraceae (06 spp.), Lamiaceae (05 spp.), Fabaceae (03 spp.), and Euphorbiaceae (03 spp.) were the most cited. Many of the medicinal species belonging to those representative families have been studied from chemical and pharmacological points of view, and are therefore of great interest to science [24] (Table 1).

Table 1 Medicinal plants of the public health system in the city of Abaetetuba, Brazilian Amazon.

Popular name	Scientific name	Family	Citation	Habit	Origin	RENISUS
Abacaxi	<i>Ananas comosus</i> (L.) Merr.	Bromeliaceae	1	Herb	Native	Yes
Alecrim	<i>Rosmarinus officinalis</i> L.	Lamiaceae	3	Herb	-	-
Amor crescido	<i>Portulaca pilosa</i> L.	Portulacaceae	3	Herb	Native	Yes
Anador/ Sete dores	<i>Plectranthus barbatus</i> Andrews	Lamiaceae	7	Herb	Exotic	Yes
Aroeira	<i>Schinus terebinthifolia</i> Raddi	Anacardiaceae	1	Bush	Exotic	Yes
Arruda	<i>Ruta graveolens</i> L.	Rutaceae	2	Herb	Exotic	Yes
Babosa	<i>Aloe vera</i> (L.) Burm.	Xanthorrhoeaceae	7	Herb	Exotic	Yes
Barbatimão	<i>Stryphnodendron barbatimam</i> Mart.	Fabaceae	11	Tree	Exotic	Yes
Boldo	<i>Vernonia condensata</i> Baker.	Asteraceae	93	Bush	Exotic	-
Camomila	<i>Matricaria recutita</i> L.	Asteraceae	2	Herb	Exotic	Yes
Canafiche/ Canarana	<i>Costus arabicus</i> L.	Costaceae	3	Bush	Native	Yes
Canela	<i>Cinnamomum verum</i> J. Persl	Lauraceae	6	Tree	Exotic	-
Capim santo	<i>Cymbopogon citratus</i> (DC.) Stapf.	Poaceae	4	Herb	-	-
Mamorana	<i>Pachira insignis</i> (Sw.) Sw. ex Savigny	Malvaceae	1	Tree	Native	-
Caxingubam	<i>Ficus insipida</i> Willd.	Moraceae	1	Bush	Native	-
Coramina	<i>Pedilanthus tithymaloides</i> (L.) Poit.	Euphorbiaceae	3	Bush	-	-
Cravo	<i>Tagetes erecta</i> L.	Asteraceae	2	Herb	Native	-
Erva cidreira	<i>Lippia alba</i> (Mill.) N.E. Br.	Verbenaceae	42	Bush	Native	-
Erva doce	<i>Pimpinella anisum</i> L.	Apiaceae	9	Herb	-	-
Eucalipto	<i>Eucalyptus globulus</i> Labill.	Myrtaceae	1	Tree	-	Yes
Gengibre	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	1	Herb	Exotic	Yes
Hortelã	<i>Mentha</i> sp.	Lamiaceae	15	Herb	-	Yes
Hortelazinho	<i>Mentha</i> sp.	Lamiaceae	3	Herb	-	Yes
Jucá	<i>Caesalpinia ferrea</i> Mart	Fabaceae	24	Tree	-	-
Limão	<i>Citrus limon</i> (L.) Burm.	Rutaceae	14	Bush	-	-
Marcela	<i>Pluchea sagittalis</i> (Lam)	Asteraceae	2	Herb	-	-
Marupazinho	<i>Eleutherine bulbosa</i> (Mill.)	Iridaceae	11	Herb	Native	-
Mastruz	<i>Chenopodium ambrosioides</i> L.	Amaranthaceae	5	Herb	-	Yes
Noni	<i>Morinda triphylla</i> (Ducke) Steyerm.	Rubiaceae	5	Tree	Native	-
Óleo Elétrico	<i>Piper callosum</i> Ruiz & Pav.	Piperaceae	5	Bush	Native	-
Oriza	<i>Pogostemon heyneanus</i> Benth.	Lamiaceae	3	Herb	-	-
Pariri	<i>Fridericia chica</i> L.G.Lohmann	Bignoniaceae	4	Bush	Native	-
Peão roxo	<i>Jatropha gossypifolia</i> L.	Euphorbiaceae	1	Bush	Native	Yes
Pirarucu	<i>kalanchoe pinnata</i> (Lam.) Pers	Crassulaceae	5	Herb	Native	Yes
Quebra-pedra	<i>Phyllanthus ninuri</i> L.	Phyllanthaceae	7	Herb	-	Yes

Sacaca	<i>Croton cajura</i> Beth	Euphorbiaceae	1	Bush	-	-
Salva	-	Asteraceae	1	-	-	-
Sicurijú	<i>Mikania lindleyana</i> DC.	Asteraceae	12	Liana	-	-
Sucuúbá	<i>Himatanthus articulatus</i> (Vahl) Woodson	Apocynaceae	2	Tree	Native	
Vassorinha	<i>Scoparia dulcis</i> L.	Plantaginaceae	1	Herb	Native	-
Verônica	<i>Dalbergia</i> sp.	Fabaceae	3	Liana	Native	-

The ten species with the greatest cultural salience among the people registered in the public health system were: "boldo" [*Vernonia condensata* Baker.], "cidreira" [*Lippia alba* (Mill.) N.E. Br.], "jucá" (*Caesalpinia ferrea* Mart), "hortelã" (*Mentha* sp.), "limão" [*Citrus limon* (L.) Burm.], "sicurijú" (*Mikania lindleyana* DC.), "barbatimão" (*Stryphnodendron barbatimam* Mart.), "marupazinho" [*Eleutherine bulbosa* (Mill.)], "anador" or "sete dores" (*Plectranthus barbatus* Andrews), and "erva doce" (*Pimpinella anisum* L.), see Table 2.

The most-cited herbs were: "hortelã" (*Mentha* sp.), "marupazinho" [*Eleutherine bulbosa* (Mill.)], "anador" or "sete dores" (*Plectranthus barbatus* Andrews), "erva doce" (*Pimpinella anisum* L.), and "quebra-pedra" (*Phyllanthus ninuri* L.). The predominance of herbs may be related to the fact that plants of that habit are easier to cultivate, which helps ensure their availability [25].

The medicinal species whose origins could be determined including 16 species native to the Amazon, while nine are exotic to the region. The flora of the Brazilian Amazon offers an appreciable medicinal potential due to its large number of native and exotic plants [1]. Native plants from the Amazon reflect a strong endemic trait in the herbal medicine of Abaetetuba [7], while the use of exotic species in the plant pharmacopoeia of northern South America reflects a European cultural heritage in the colonization of the region [26].

Seventeen (17) of the species used in Abaetetuba were also encountered in the list of plants of interest to the Brazilian public health system. We emphasize *Vernonia condensata* (boldo) as the most-cited species and as a species listed in the health system- indicating it as a promising source of antioxidants [28].

Table 2 Use of medicinal plants in the public health system.

Popular name	Medicinal Properties	Citations	%
Boldo	Assists in the treatment of liver and stomach diseases [27]	93	38,58
Cidreira	Naturally soothing, with mild analgesic and antispasmodic properties [3] [27]	42	17,42
Jucá	Wound healing, and acts as an anti-inflammatory [11]	24	9,95
Hortelã	Used in liver ailments and respiratory disorders [3]	15	6,22
Limão	Natural diuretic, antiscorbutic, with anti-rheumatic, astringent, with antiseptic action [27]	14	5,80
Sicurijú	Anti-inflammatory and healing. Used in liver treatments, chronic and varicose ulcers [1]	12	4,97
Barbatimão	Treat uterine bleeding, vaginal discharge, healing, and anti-inflammatory [1] [3] [27]	11	4,56
Marupazinho	Treatment of diarrhea and worm elimination [27]	11	4,56
Anador/ sete dores	Treats liver disorders and aids digestion. Also used to treat gastritis, gastric ulcers, and headaches [3] [27]	10	4,14
Erva doce	Stimulates digestive functions, helps eliminate gas and fight colic, also treats headaches [27]	9	3,80
		241	100

4. Conclusion

It will be necessary to improve the training of the health professionals responsible for filling out the registration documents of the public health system. Young and adult women with elementary school educations, together with housewives, are the people who most reported the use of medicinal plants. Herbs compose a large percentage of the native Amazon species used in popular medicine, although exotic species are also frequently sought after and used. The medicinal species mentioned in the records of the public health system in Abaetetuba can also be found in the National List of Medicinal Plants of Interest to the Unified Health System. *Vernonia condensata* is considered a plant of interest to the Brazilian health system, being identified here as the principal specie listed and used in Abaetetuba.

Compliance with ethical standards

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Disclosure of conflict of interest

All authors declare no conflict of interest.

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