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Original article

Quilombola ethnomedicine: The role of age, gender, and culture change

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ABSTRACT

Non-indigenous communities are particularly insightful in terms of understanding the process of healing plant acquisition and loss. This study explores the traditional medicinal plant knowledge and use of a long-isolated, African-descended community in the Atlantic rainforests of northeastern Brazil. We investigated the primary plant species used and their therapeutic applications. We hypothesized that women and the oldest members of the community would be the most knowledgeable about medicinal plants. We carried out semi-structured interviews and walk-in-the-woods plant collecting techniques with 74 informants. We identified 133 ethnospecies of plants used to treat a wide variety of illnesses. The most commonly used plant parts were leaves; the most common form of preparation was as infusion. As anticipated, medicinal plant knowledge generally increased with age. However, there was no significant gender difference in plant knowledge. We attribute this to the increasingly similar livelihood roles and geographical spaces occupied by men and women in the community. There was, however, a trend for women to be more knowledgeable about the healing properties of herbaceous and cultivated plants. Increasing contact with the outside world has resulted in a confluence of traditional, often African-derived healing therapies, with the novel healing plant knowledge and allopathic medicine of outsiders.

Keywords: ethnobotany, African diaspora, quilombolas, medicinal plants, maroon

Introduction

Afro-descendant communities are found in several countries in Latin America, being known by different names, such as *quilombos* or *mocambos* (Brazil), *palenques* (Colombia), *cumbes* (Venezuela), *marrons* (Haiti and French Caribbean Islands), *cimaronaje* (Cuba and Puerto Rico), and *maroons* (Jamaica, English Caribbean, Suriname, and Southern USA) (Gomes 2015). All these historical experiences were mainly the result of collective escapes and the establishment of communities as one of the forms of resistance to the socioeconomic model based on slavery, which still prevails in some of these countries today, functioning as strategic spaces for the maintenance of identities, ancestry, and environmental relations (Nazaré 2019).

In Brazil, the term *quilombo* has been resemantized over the years, moving from a historical category of escaped African slave enclaves to becoming a socio-anthropological category (Leite 2000). Today *quilombola*

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communities represent "ethnic-racial groups, according to self-definition criteria, with their own historical trajectory and presumption of Black ancestry related to a process of resistance to the suffered historical oppression" (Brasil 2003). These communities are spread over almost all states in the country and are the result of a complex process of territorial occupation and self-creation of culture based on kinship and the collective use and management of land (Gomes 2015).

To date, 3,524 Afro-descendant communities have been inventoried in Brazil, with an upper estimate of up to 5,000. Of these, 811 are located in the northeastern state of Bahia (Fundação Cultural Palmares 2020). Ethnobotanical research in these rural Afro-descendant communities has increased significantly in recent years, focusing mainly on medicinal plant surveys (Mota & Dias 2012; Silva *et al.* 2012a; Ferreira *et al.* 2014), some using participatory tools and local perception (Zank *et al.* 2016), others using quantitative techniques to determine the influence of cultural or ecological features on the knowledge and use of traditional medicine (Gomes & Bandeira 2012; Silva *et al.* 2012b; Santana *et al.* 2016; Pereira & Coelho-Ferreira 2017), and still others exploring other non-medicinal categories (Ávila *et al.* 2015, Conde *et al.* 2017; Santos *et al.* 2019).

In the Recôncavo region of Bahia, the marine estuary of Iguape Bay has great ecological value and allows the permanence of many communities of artisanal fishers and shellfish gatherers, which favored the creation of a Marine Extractive Reserve Iguape Bay (Resex) (Zagatto 2013). This Resex was also the result of the mobilization of local residents, fishers, and members of the Cachoeira Rural Workers Syndicate, which strategically acted to attract basic public policies, since it is a region with various needs, in addition to avoiding predatory fishing (Zagatto 2013). Roughly 92 communities live in the vicinity of the Resex, 26 of which are recognized as *quilombola* remnants (ICMBIO 2009). There have been few ethnobiological studies carried out in the immediate region to date; most have focused on the ethnoecological aspects of artisanal fishing (Brito 2011; Casal & Souto 2011; Martins 2014; Casal & Souto 2018), with few exploring only the use of plant resources (Santana *et al.* 2016; Lisboa *et al.* 2017). This is true despite the environmental importance of the Atlantic Forest region for the traditional communities, who depend on plant resources for subsistence and maintenance of their ways of life.

The influence of socioeconomic issues on the knowledge and use of plant resources is an important topic in ethnobotanical studies, as local/traditional communities have particularities that are difficult to classify into patterns (Torres-Avilez *et al.* 2016). Age, for example, is a factor often associated with a process of cultural erosion, that is, more knowledge of plant resources is recorded by older people compared to younger people in a community (Voeks & Leony 2004). Gender has been associated with a knowledge of plants that reflects the influence of different issues in communities, especially those related to the division of space and labor (Howard 2003; Pfeiffer & Butz 2005; Voeks 2018). For example, greater knowledge of medicinal plants by women is something that has been observed in various rural / traditional communities in Brazil (Monteles & Pinheiro 2007; Voeks 2007; Almeida *et al.* 2012; Gomes & Bandeira 2012; Silva *et al.* 2012b; Conde *et al.* 2017) as well as in other countries, including Thailand (Cruz-Garcia & Price 2011), Dominica (Quinlan & Quinlan 2007; Quinlan *et al.* 2016), Nicaragua (Coe & Anderson 1996), Ethiopia (Hunde *et al.* 2015), Saudi Arabia (Alqethami *et al.* 2020; and Nepal (Kutal *et al.* 2021). In most of these cases, women maintain a social role more related to home and family health care (Voeks & Leony 2004; Wayland & Walker 2014). Moreover, in tropical landscapes there is often a spatial division in which men are more familiar with medicinal plants in the forest, whereas women know more about the healing flora of anthropogenic landscape units, such as gardens and trails (Luoga *et al.* 2000; Lyon & Hardesty 2012; Voeks 2018; Kutal *et al.* 2021). However, a host of other socio-cultural variables may be associated with gender and age, making it difficult to establish simple generalizations (Pfeiffer & Butz 2005; Vandebroek & Balick 2012; Quinlan *et al.* 2016; Torres-Avilez *et al.* 2016).

This study deepens themes previously addressed by Santana *et al.* (2016) on the socioeconomic and ecological aspects of the traditional knowledge of medicinal plants from the Salamina Putumuju community, the first *quilombola* community in the region to obtain legal recognition of territoriality. Our objective is to investigate the knowledge of medicinal plants in this quilombola community, analyzing the influence of age and gender on the distribution of this knowledge. We investigated the following questions: 1) What are the main therapeutic indications, parts used, and ways of preparing medicinal plants in the community? 2) Are age and gender associated with differential knowledge and use of medicinal plants? 3) How is culture change in the form of modernization affecting the knowledge and use of medicinal plants? Our working hypothesis was that women and the oldest members of the community would be the most knowledgeable about medicinal plants.

Material and Methods

Study area

The focal community of this study is Salamina Putumuju, located at 12° 46' 40" S and 38° 55' 08" W, in the Recôncavo region of Bahia (Fig. 1). The regional climate is tropical hot and humid (Koppen Af,), with an average annual temperature of 25.4 °C, annual rainfall of 1,000 to 1,800 mm, and a rainy season from April to June (INCRA 2006). The regional vegetation is dominated by mangroves and by the Atlantic Tropical Forest biome, one of the most

biodiverse, endemic, and threatened ecosystems on Earth (Myers *et al.* 2000; Rezende *et al.* 2018). According to a report by INCRA (2006), these ecosystems are in a good state of conservation due to the appropriate use and management by the local community. On-site studies have shown a positive association between remnants of the Atlantic Tropical Forest and the presence of this community (Martins 2014).

The Salamina Putumuju community is remnant of a historic *quilombo* called Putumuju, and is one of several traditional communities in the region that received enslaved people fleeing from coastal areas (INCRA 2006). The local population was recognized as a remnant *quilombo* in 2004, and in November 2013 was the first *quilombola* community in the region to obtain land titling (Santana *et al.* 2016). It is located on the banks of the Paraguaçu River and today has about 200 residents.

The lack of infrastructure for embarkation and disembarkation in the ports of each village made travel nearly impossible in the past, and this problem persists to the present day. Community members are completely dependent on boats for travel to markets, clinics, schools, or for recreation (INCRA 2006).

Martins (2014), who conducted a comprehensive ethno-ecological study in the community, identified several important phases in the history of the community, according to the narratives of the interviewed extractivists. These ranged from the process of escape and formation of the *quilombo*, through the period of the sugar mill, the protracted farm period, and finally the current moment of certification as a *quilombola* community. This protracted narrative of resistance explains many of the community's socio-cultural aspects and current ways of life, including ties of solidarity and autonomy in the extraction of its main sources of income, in particular the artisanal fishing and collection of piassava fiber (Fig. 2A-B). The extraction of sheath fiber from piassava palms (*Attalea funifera*) for commercial production of brooms and brushes (Voeks 1988) is carried out by a large part of the community, especially men, although women are increasingly involved. Subsistence also includes small-scale planting of fields (cassava, yams, corn, peanuts, potatoes, bananas, and beans), oil palm extraction, beekeeping and small animal breeding, all activities that were previously prohibited from being carried out by the landowners (Martins 2014). Plantation gardens are located close to homes, which also have backyards, usually with many cultivated plant species, especially fruit trees, such as mango, jackfruit, cashew, and banana, which are also important sources of food (INCRA 2006; Martins 2014). Some of the cultivated food plants are also used for

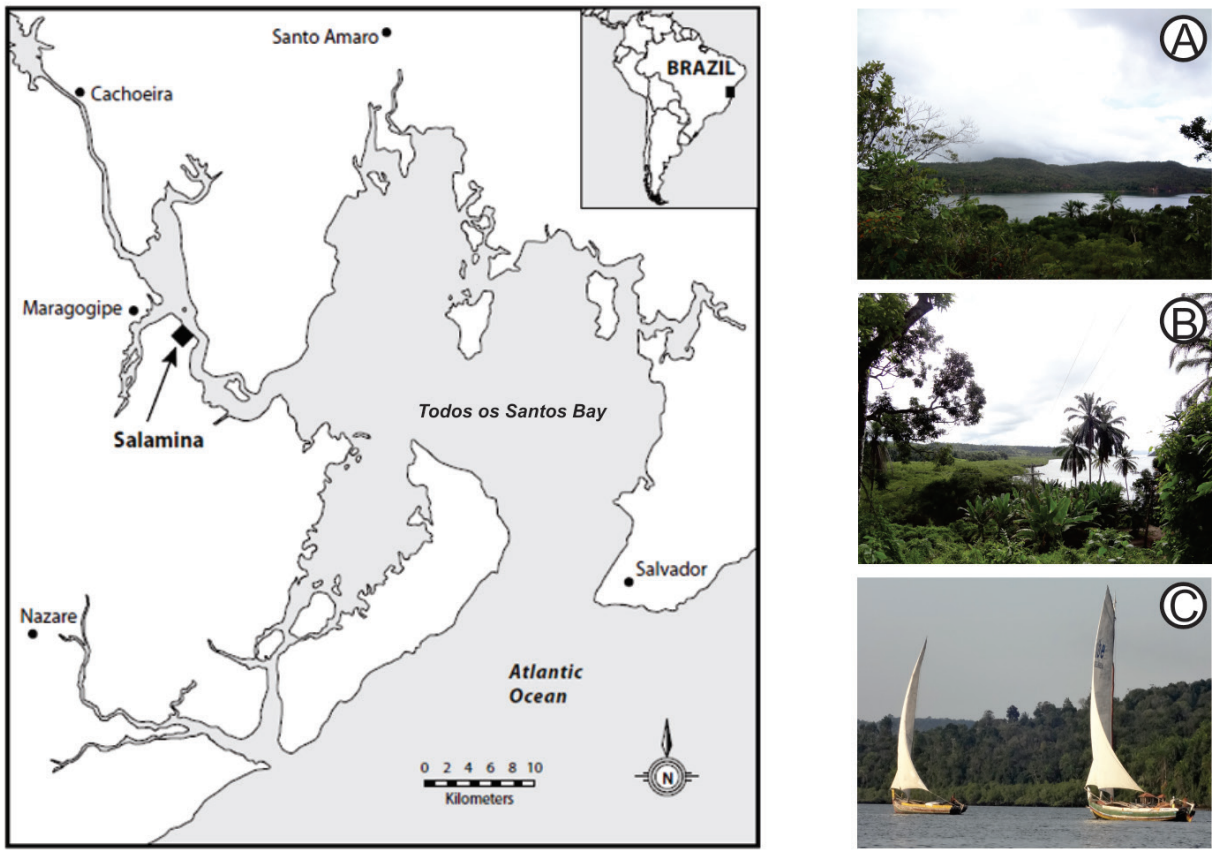

Figure 1. Location of the Salamina Putumuju Afro-descendant Community in the municipality of Maragogipe, Recôncavo region of Bahia State, Brazil (modified from Hadlich *et al.* 2008); **A-C** – Views of the region surrounding Salamina Putumuju within the Atlantic Forest, on the banks of the Paraguaçu River in Iguape Bay.

medicinal purposes, thus increasing the ethnomedicinal repertoire (Santana *et al.* 2016).

The residents of the community have witnessed many improvements in recent years, including access to social programs, health care, and the provisioning of motorboats (Martins 2014). However, the community still has neither piped water nor basic sanitation, and did not receive electrification until 2013. On site there is a multi-grade

Figure 2. Main economic activities carried out in Salamina Putumuju in the municipality of Maragogipe, Recôncavo region of Bahia State, Brazil (**A** - artisanal fishing, and **B** – piassava extraction) and ethnobotanical interviews and collections of plants (**C** - interview, **D** - collection in the yard, **E** - collection in the trail, and **F**- collection in the forest).

school for children during the early years of schooling, after which students are transferred to schools at the headquarters of the Maragogipe municipality. The seat of the municipality is also the point of access to modern biomedicine, through health clinics and pharmacies. Due to the absence of a clinic in the community, as well as the absence of enough boats to allow continuous commuting between the community and the municipality, access to allopathic medicine is still precarious (Martins 2014).

Finally, the recent arrival and increasing influence of the neo-Pentecostal church in the community is important in understanding the changing cultural dynamics of the community. As demonstrated by recent anthropological research in the area (INCRA 2006), the influence of evangelical religion often acts as an inhibiting factor in the use of plants for religious or ritualistic purposes linked to the Afro-Brazilian religion Candomblé, as well as other manifestations of African influence in the region, such as *Samba de Roda*.

Ethnobotanical survey

The selection of informants was made by visits to all the families in the community. This resulted in a total of 74 informants, 37 men and 37 women, between 18 and 80 years of age. According to a questionnaire carried out in the community by INCRA (2006), this age cohort was constituted by 106 individuals, meaning that the census of 74 people represented roughly 70 % of the population. The inclusion criterion of the sample did not differentiate the total time spent living in the community, meaning that some members had lived away from Salamina Putumuju for parts of their lives.

Visits took place from May to October 2014, with interviews beginning after two months of contact with the community and lasting two to three days in each visit. For each informant who agreed to participate in the study, a Prior Informed Consent Form was requested, a document that clarifies the objectives of the study and the informant's option to accept or not collaborate with the interview. This term was obtained by the CEP (Research Ethics Committee) of UEFS (State University of Feira de Santana). Authorization to carry out this study on the intangible patrimony of a *quilombola* community in Brazil was granted by IPHAN— "Instituto do Patrimônio Histórico e Artístico Nacional" (The National Institute of Historic and Artistic Patrimony) by means of process n° 01450.012605/2013-3.

Semi-structured interviews were carried out (Albuquerque *et al.* 2010) with questions about socioeconomic and ecological aspects of the species with medicinal uses (see Santana *et al.* 2016), in addition to questions about the therapeutic uses, parts used, and ways of preparing and applying the cited plants. Informal questions were also asked about the use of allopathic remedies (*e.g.*, preference for allopathic over homemade remedies).

The collections of botanical material were obtained through walks-in-the-forest with some informants who were willing to walk the trails or the yards at the end of the interviews (Albuquerque *et al.* 2010) (Fig. 2C-F). Collected plants were identified with the help of literature and comparison with dried specimens by specialists. Voucher specimens were deposited at the Herbarium of the State University of Feira de Santana (HUEFS). All species were classified according to APG IV (2016). For plants that we could not collect, we used photos to confirm possible biological names (Albuquerque *et al.* 2010).

A generalized linear model (GLM) was used to assess the role of sex and age as explanatory variables, as well as the interaction between them, in order to determine the number of species cited for medicinal purposes, which was the response variable. As the model with a Poisson distribution was overdispersed, the quasi-Poisson distribution was used. The analysis was carried out in R Development Core Team (2014), Version 4.0.4. Chi-square tests were carried out on PAST, version 2.17c (Hammer *et al.* 2001), in order to verify possible differences in the cultural and ecological knowledge of plants (management methods, biogeographic origin, and habit) between men and women in the community.

Results

Species richness: therapeutic indications, parts used, and ways of preparing the plants

There were 133 medicinal ethnospecies registered in the Salamina Putumuju community, including 105 identified to the level of species, and 13 to genus, for a total of 118 biological species employed to treat a wide variety of illnesses. These were distributed in 100 genera and 50 families. Fifteen ethnospecies were not collected, due to difficulties accessing them in the field, as well as others that were purchased in markets. The medicinal plants identified in the Salamina community, their therapeutic indications, parts used, and forms of preparation are shown in Tab. 1. Considering the number of citations per person, the parts of the plants most used were: leaf (58.7 %), whole plant (23.8 %), fruit (14 %), bark (10.5 %), root (9.8 %), flower (3.5 %), seed (3.5 %) and bulb (2.1 %) (Fig. 3A). Regarding the forms of preparation, tea stands out as the most common method of preparation in the community (61.5 %), followed by bathing (22.4 %), topical use (18.2 %), syrup (17.5 %), juice (9.1 %), ingestion (8.4 %), and porridge (0.7 %) (Fig. 3B).

Reports on the perception of some residents about on preferences for medicinal plants for primary care in relation to allopathic medicine: accessibility and availability

The testimonies mentioned below, from informal dialogue with the participants, illustrate the ease of

Table 1. Medicinal plants cited by informants of the Salamina Putumuju community in the municipality of Margojipe, Recôncavo region of Bahia, northeastern Brazil. Family/Scientific name/Local name. Therapeutic(s) indication(s). Parts used. Ways of preparing or use.

Family/scientific name/local name	Therapeutic(s) indication(s)	Parts used	Ways of preparing or using	Voucher
Acanthaceae				
Justicia cf. *pectoralis* var. *stenophylla* Leon./Anador	Dental inflammation; fever; headache; pain in general	Leaf	Bath; tea	BFS 266
Amaranthaceae				
Alternanthera cf. *brasiliana* (L.) Kuntze/ Benzetacil or Bezetacil	Colic; dental inflammation; headache; inflammation; pain in general; wound	Leaf	Bath; tea; topical use	BFS 195
Beta vulgaris L./Beterraba	Flu	Root (tuber)	Syrup	----------
Dysphania ambrosioides (L.) Mosyakin & Clemants/Mastruz ou Matruz	Colic; cough; flu; inflammation; malaise; nasal congestion; prostate problems; trauma; worms; wounds	Leaf; whole plant	Juice (maceration with milk or water); tea; topical use	BFS 183
Amaryllidaceae				
Allium cepa L./Cebola	Flu; indigestion	Bulb; leaf (external)	Syrup; tea	----------
Allium sativum L./Alho	Boil; colic; cough; flu; gas; headache; inflammation; stroke;"unload the body";	Bulb; leaf (external)	Bath; syrup; tea	----------
Anacardiaceae				
Anacardium occidentale L./Cajueiro branco e vermelho	Aphrodisiac; dental inflammation; diabetes; flu; inflammation; nasal inflammation; snakebite; spinal diseases; wound	Fruit; Stem(bark)	Bath; ingestion; syrup; tea; topical use	BFS 210
Mangifera indica L./Manga	Flu	Leaf (abaxial side)	Syrup; tea	BFS 209
Schinus terebinthifolia Raddi/Aroeira	Dental inflammation; dysentery; fever; flu; general inflammation; itch; spiritual protection; wound	Leaf; stem(bark)	Bath; syrup; tea	BFS 187
Annonaceae				
Annona cf.*atemoya* Mabb/Jaca-de-pobre ou Mololô	High cholesterol; snakebite	Leaf	Bath (juice with water and kerosene); tea	BFS 220
Annona muricata L./Graviola	Renal disorders	Leaf	Tea	----------
Annona cf./Apa-de-lima ou Fruta-do conde	Renal disorders	Leaf	Tea	BFS 269
Apocynaceae				
Hancornia speciosa Gomes/Mangaba	Toothache; worm	Stem (latex); immature fruit	Topical use; ingestion	BFS 225
Himatanthus cf. *obovatus* (M.Arg.)Wood/Pau-de-leite	Stanch blood	Stem (latex)	Topical use	BFS 213
Araceae				
Dieffenbachia seguine (Jacq.)Shott/Comigo-ninguém-pode	Spiritual protection	Whole Plant	----------	----------
Arecaceae				
Allagoptera cf. *caudescens (Mart.) Kuntze* /Buri	Diabetes	Fruit	Tea	BFS 274
Cocos nucifera L./Coco	Dysentery; renal disorders; toothache; urinary incontinence	Fruit (liquid or bark)	Bath; ingestion (endosperm); tea	----------
Syagrus coronata (Martius) Beccari/Licuri ou Nicuri	Blurred vision	Fruit (liquid)	Topical use	----------
Asparagaceae				
Aloe vera (L.)Burm. F./Babosa	Haircare	Leaf (liquid)	Topical use	----------
Dracaena trifasciata (Prain) Mabb./Espada-de-Ogum	Spiritual protection	Whole Plant	----------	----------

Table 1. Cont.

Family/scientific name/local name	Therapeutic(s) indication(s)	Parts used	Ways of preparing or using	Voucher
Asteraceae				
Acanthospermum cf.*hispidum* DC./Boticudo ou Mané-velho	Childblain; dental inflammation; fever in children; inflammation; itch	Leaf; whole Plant	Bath; tea	BFS 172
Ageratum conyzoides L./Mentrasto	Body pain; fever; pain of giving birth; post pregnancy cleansing	Whole Plant	Bath; tea	BFS 161
Bidens pilosa L./Picão	Lose weight	Whole Plant	Tea	BFS 164
Conocliniopsis cf. *prasiifolia* (DC.) R.M.King & H.Rob./Bamburrá	Teething pain (when the tooth is born)	Whole Plant	Bath	BFS 217
Gymnanthemum amygdalinum (Del) Sch. Bip. ex Walp./Alumã ou Arrumã	Abortion; colic; delayed menstruation fever; flu; hair restoration; indigestion; pain in general; throat inflammation; worms	Leaf	Tea; topical use	BFS 165
Mikania sp./Mesca-de-rama	Backpain; diabetes; inflammation; pain in general; rheumatism; to increase appetite	Leaf; whole plant	Bath; tea	BFS 197
Moquiniastrum cf. *polymorphum* (Less.) G. Sancho /Candeia	Indigestion	Leaf	Tea	BFS 249
Vernonanthura cf. *polyanthes* (Sprengel) Vega & Dematt. /Assa-peixe-branco	Inflammation; renal disorders	Leaf	Tea	----------
Rolandra cf. *fruticosa* (L.) Kuntze/João-Moleque ou Costa-branca	Colic; indigestion	Leaf; whole plant	Tea	BFS 196
Trixis cf./Rabo-de-raposa	Itch; mycosis;warts	Leaf; whole plant	Bath; topical use	BFS 207
Boraginaceae				
Varronia curassavica Jacq. /Maria-preta ou Rompe-gibão	congestion; cough; flu; gastritis; nasal constipation	Leaf	Juice (with milk); syrup; tea	BFS 232
Bromeliaceae				
Ananas comosus (L.) Merril /Abacaxi	Nasal congestion	Immature fruit	Syrup	----------
Caricaceae				
Carica papaya L./Mamão	Colic; constipation; mycosis; worms	Fruit; leaf; seed	Juice (with milk); ingestion; tea	----------
Cleomeaceae				
Cleome sp./Cessé	"bubbles inthebody", fever	Leaf; whole plant	Bath; syrup; tea	----------
Convolvulaceae				
Ipomea asarifolia (Ders.)Roem. & Schult/Salsa-brava	Wound	Whole plant	Bath	BFS 226
Costaceae				
Costus spiralis (jacq.)Roscoe /Cana-de-macaco	Renal disorders	Stem (sap)	Tea; ingestion	BFS 188
Crassulaceae				
Kalanchoe pinnata (Lam.) Pers. /Folha-da-fortuna ou folha-da-costa	Cough; flu; mycosis; nasal congestion	Leaf	Bath; syrup	BFS 254
Cucurbitaceae				
Cucumis anguria L./Maxixe	Mycosis	Fruit	Topical use	----------
Cucurbita pepo L./Abóbora	Earache	Flower	Bath	----------
Cyperaceae				
Rhynchospora nervosa (Vahl) Boeckeler/Capim-estrela	Dental inflammation; flu; nasal congestion	Whole Plant	Syrup; tea	BFS 186

Table 1. Cont.

Family/scientific name/local name	Therapeutic(s) indication(s)	Parts used	Ways of preparing or using	Voucher
Dilleniaceae				
Dillenia sp./Cipó-vermelho ou Cipó-caboclo	Eye diseases	Stem (sap)	Topical use	BFS 179
Euphorbiaceae				
Cnidoscolus urens (L.)/Cansanção	Dental inflammation	Stem (sap)	Topical use	BFS 193
Codiaeum cf./Cróton	Animal inflammation	Root (tuber)	Topical use	BFS 218
Jatropha gossypiifolia L./Pinhão-roxo	Spiritual protection	Whole plant	---------	BFS 267
Manihot esculenta Crantz/Mandioca	Diarrhea; flu; nasal congestion	Root (tuber)	Porridge	BFS 271
Ricinus communis L./Mamona	Indigestion	Fruit (oil)	Tea	BFS 253
Fabaceae				
Arachis hypogaea L./Amendoim	Aphrodisiac	Seed	Ingestion	----------
Mimosa pudica L./Malissa	Dental inflammation; spiritual protection;	Leaf; whole plant; flower	Bath; tea	BFS 208
Senna alexandrina Mill./Sene	Weight loss	Leaf	Tea	----------
Senna cf. *occidentalis* (L.) Link/Fedegoso ou Camacho	Childblain; fever; flu; headache; menses delayed	Leaf; root; whole plant	Bath; tea	BFS 243
Stryphnodendron cf.*adstringens* (Mart.)Coville/ Barbatimão ou Babatenã	Childblain; dental inflammation; diabetes; gastritis; inflammation; liver diseases; pain in general; prostate problems; wound	Stem (bark)	Bath; tea; Topical use (powder)	----------
Stylosanthes gracilis Kunth./Língua-de-galinha	Boils	Leaf; whole plant	Topical use (juice with soap or compress with alho)	BFS 255
Tamarindus indica L./Tamarindo	Itch; back pain	Leaf; Stem (bark)	Bath; tea	BFS 216
Zornia diphylla (L.)Pers./Arrozinho	Calmative for children; constipation in children; diarrhea; flu; gas in children; inflammation; liver diseases; renal disorders; teething pain	Root; whole plant;	Tea	BFS 166
Gentianiaceae				
Coutoubea spicata Aubl./Papai-nicolau	Abortifacient; diabetes; flu	Leaf	Tea; Juice (with cachaça)	BFS 242
Lamiaceae				
Melissa officinalis L./Melissa	Fever; flu; high blood pressure; stress relief	Leaf	Tea	BFS 252
Mesosphaerum suaveolens (L.) Kuntze /Batônica	Inflammation in the ovary; pain in general; renal disorders; rheumatism	Whole plant	Bath; tea	BFS 199
Ocimum cf. *basilicum* L./Alfavaca	Delayed menstruation; fever; flu in children; indigestion; nasal congestion;	Leaf	Tea	BFS 191
Ocimum gratissimum L./Quioiô	Bodyache; childblain; high cholesterol; itch; for weight loss; flu; toothache	Leaf	Bath; tea	BFS 176
Ocimum sp./Manjericão	Spiritual protection	Leaf	Bath	----------
Plectranthus amboinicus (Laur.) Spreng./Hortelã-graúda	Flu; nasal congestion; stress relief	Leaf	Syrup	BFS 190
Plectranthus cf. *barbatus* Andr./Tapete-de-Oxalá	Abortifacient	Leaf	Tea	----------
Plectranthus neochilus Schtr./Boldo	Abortifacient; colic; constipation; diseases of the prostate and kidneys; flu; gases; pain in general	Leaf	Tea	BFS 219

Table 1. Cont.

Family/scientific name/local name	Therapeutic(s) indication(s)	Parts used	Ways of preparing or using	Voucher
Lauraceae				
Cinnamomum verum J.Presl /Canela	Gas	Leaf	Tea	BFS 178
Laurus nobilis L./Louro	Indigestion	Leaf	Tea	----------
Persea americana Mill./Abacate	Diabetes; high blood pressure; pain in general; renal disorders	Leaf	Tea	BFS 223
Malpighiaceae				
Byrsonima sp./Murici	For weight loss; flu; high blood pressure; spinal diseases; spiritual protection	Leaf	Bath; tea	BFS 211
Malpighia glabra L./Acerola	Fever; flu	Leaf	Syrup; tea	BFS 238
Malvaceae				
Pavonia cf. *cancellata* (L.) Cav./Baba-de-boi	Dysentery; haircare	Leaf; whole plant	Tea; Topical use	BFS 189
Sida cf. *cordifolia* L./Malva-branca	Childblain; flu; indigestion; inflammation; itch; menses delayed; mycosis; vaginal discharge; spiritual protection; wound	Leaf; whole plant	Bath; tea	BFS 181
Sida cf.*linifolia* jus. ex Cav./Língua-de-vaca	Flu; wound	Leaf; whole plant	Bath; tea	BFS 198
Meslastomataceae				
Clidemia cf. *hirta* (L.) D. Don./Leaf-de-fogo ou Cocô-de-urubu	Burns	Leaf	Topical use (powder)	BFS 246
Miconia albicans (Sw.) Triana/ Canela-de-velho/Camacho	Colic; diabetes; dysentery; flu; indigestion; pain in general	Leaf	Tea	BFS 173
Moraceae				
Morus alba L./Amora	Dental inflammation	Stem (sap)	Topical use	BFS 227
Musaceae				
Musa paradisiaca L./Bananeira	Dysentery; stanch blood	Immature fruit; Stem (sap);	Tea; topical use	BFS 275
Myristicaceae				
Myristica fragrans Hont/Noz-moscada	High blood pressure; stroke	Fruit	Tea	----------
Myrtaceae				
Eucalyptus cf. *globulus* Labill./Eucalipto	Flu	Leaf	Syrup; tea	----------
Eugenia uniflora L./Pitanga	Cough; fever; flu; dental inflammation; throat inflammation; headache	Leaf	Syrup; tea	BFS 184
Psidium guajava L./Goiaba	Dysentery	Leaf (new)	Tea	BFS 234
Psidium guineense SW./Araçá-mirim	Dysentery; flu; throat inflammation	Leaf (new)	Tea	BFS 169
Syzygium aromaticum (L.)Merrill et Perry/Cravo	Abortifacient; throat inflammation	Flower bud	Tea	----------
Syzygium cumini (L.) Skeels/ João-melão ou Ogum-me-chama	Diabetes; high cholesterol; for weight loss	Fruit; leaf	Juice; tea	BFS 272
Syzygium malaccense (L.) Merr. & L.M. Perry/Jambo	Diabetes; heartdisease; high cholesterol; kidney stone	Fruit; leaf	Ingestion; tea	BFS 268
Nyctaginaceae				
Mirabilis jalapa L./Purga-de-batata	Animal screw worm; urinary incontinence	Root (tuber)	Ingestion (zest and mix with coconut milk)	----------
Orchidaceae				
Vanilla cf. *planifolia* Jacks ex. Andrews/Banana-de-nicuri	Mycosis	Leaf; fruit	Topical use	BFS 214

Table 1. Cont.

Family/scientific name/local name	Therapeutic(s) indication(s)	Parts used	Ways of preparing or using	Voucher
Oxalidaceae				
Averrhoa carambola L./Carambola	High blood pressure	Leaf; fruit	Juice; tea	----------
Passifloraceae				
Passiflora edulis Sims/Maracujá	Stress relief	Fruit	Juice	BFS 251
Phyllanthaceae				
Phyllanthus niruri L./Quebra-pedra	Flu; heart disease; inflammation; renal diseases	Whole plant	Tea	BFS 170
Piperaceae				
Peperomia pellucida (L.) Kunth/Alfavaquinha-de-cobra	Constipation; dysentery; fever in children; flu in children; general inflammation; heart disease; high blood pressure; prostate problems	Whole plant	Tea	BFS 162
Piper cf. *umbellatum* (L.) Miq/Capeba	Liver diseases; pain in general	Leaf	Bath; tea	BFS 265
Plantaginaceae				
Scoparia sp./Vassoura-mofina ou Vassoura santa	Dysentery; itch; fever; flu; for hairloss; spiritual protection; stroke	Leaf; whole plant	Tea; topical use	BFS 204
Scoparia dulcis L./ Vassoura-mofina ou Vassoura santa	Dysentery; itch; fever; flu; for hairloss; spiritual protection; stroke	Leaf; whole plant	Tea; topical use	BFS 201
Stemodia foliosa Benth./Pega-pega	Itch; Spiritual protection	Leaf; whole plant	Tea; topical use	BFS 248
Poaceae				
Cymbopogon citratus (DC.)Stapf/Capim-santo	Flu; high blood pressure; fever; high cholesterol; indigestion; inflammation; stress relief	Leaf; whole plant	Tea	BFS 175
Imperata cf. *brasiliensis* Trin./Sapé	Teething pain	Root	Tea	BFS 237
Phalaris canariensis L./Milho-alpiste	Urinary infection	Seed	Tea	----------
Polygalaceae				
Asemeia cf. *violacea* (Aubl.) J.F.B.Pastore & J.R.Abbott/ Vique	Flu; wound	Leaf; root	Tea; topical use	BFS 168
Rhizophoraceae				
Rhizophora cf.*mangle* L./Mangue-vermelho	Childblain; wound	Leaf; stem (bark)	Bath; tea	BFS 200
Rosaceae				
Prunus dulcis (Mill.) D. A. Webb/Amêndoa	Back pain; diabetes	Leaf	Tea	BFS 228
Rubiaceae				
Coffea arabica L./Café	Flu; indigestion; low pressure; stanch blood	Seed	Tea (with alho and limão verdadeiro); Ingestion (mix powder with water); Topical use (under the tongue)	----------
Genipa americana L./Jenipapo	Anemia	Fruit	Juice	----------
Borreria verticillata (L.) G.Mey./Carqueja	Flu; fever; for weight loss; teething pain; throat inflammation	Root; whole plant	Tea	BFS 174
Rutaceae				
Citrus aurantium L./Laranja-da-terra	Cough; fever; flu; headache; indigestion; renal disorders;	Leaf; fruit	Syrup; tea	BFS 205

Table 1. Cont.

Family/scientific name/local name	Therapeutic(s) indication(s)	Parts used	Ways of preparing or using	Voucher
Citrus limon (L.) Osbeck /Limão-verdadeiro	Flu; headache; throat inflammation	Leaf; fruit	Syrup (with honey and alho); tea	BFS 257
Citrus sp. /Limão-cravo	Dysentery; flu	Fruit; leaf	Ingestion; tea	BFS 251
Ertela trifolia (L.) Kuntze/Maricotinha ou Maria-cutia	Flu	Root; whole plant	Syrup; tea	BFS 171
Ruta cf. *graveolens* L./Arruda	Delayed menstruation; spiritual protection	Leaf; whole plant	Bath; tea	BFS 253
Solanaceae				
Capsicum cf. *frutescens* L./Pimenta	Aphrodisiac	Fruit	Ingestion	----------
Solanum americanum Mill./Erva-de-santa-maria	Childblain; itch; wound	Leaf	Topical use	BFS 261
Solanum cf. *erianthum* D. Don/Fumo-brabo	Flu	Leaf	Syrup	----------
Solanum paniculatum L./Jurubeba	Cough; dental inflammation; flu; high blood pressure; nasal congestion	Fruit; leaf; root	Ingestion; syrup; tea	BFS 206
Urticaceae				
Cecropia sp./Embaúba	Bronchitis; flu; inflammation of the eyes; prostate problems	Leaf (new); Stem (sap)	Tea; topical use	BFS 221
Verbenaceae				
Lantana cf.*camara* L./Camará-de-chumbo	Flu	Leaf	Tea	BFS 258
Lippia alba (Mill.) N. E. Brown/Erva-cidreira	Colic; cough; fever; gas; high blood pressure; indigestion; high cholesterol; stress relief	Leaf	Syrup; tea	BFS 215
Lippia cf./Alecrim-do-mato	Headache	Leaf	Tea	----------
Stachytarpheta cayennensis (Rich.) Vahl/Tea-de-burro	Flu	Leaf	Syrup; tea	----------
Violaceae				
Pombalia calceolaria (L.) Paula-Souza /Purga-do-campo	Colic; inflammation, vaginal inflammation	Leaf; root; whole plant	Bath; tea	BFS 163
Zingiberaceae				
Alpinia cf. *zerumbet* (Pers.)B.L.Burtt & R.M.Sm./Água-de-alevante	Flu; heart disease; stress relief;	Leaf; flower	Syrup; tea	BFS 239
Sp.1 /Algodão	Inflammation; pain in child birth; pain in general; rheumatism	Leaf	Bath; tea	----------
Sp.2/Corticeira	Diabetes	Leaf	Tea	----------
Sp.3/Aquarana ou Corana	Inflammation in the tooth and eyes; spiritual protection	Leaf; stem (bark);	Bath; tea	----------
Sp.4/Caiçara	Flu; spiritual protection	Leaf	Syrup	----------
Sp.5/Duas-amigas	Intestinal cleansing	Bulb	Tea	----------
Sp.6/Erva-doce	Gas	Leaf; flower; seed	Tea	----------
Sp.7/Novalgina	Colic; fever; headache	Leaf	Tea	----------
Sp.8/Quitoco	Inflammation; Stroke	Leaf	Bath	----------
Sp.9/Salgueiro	Measles	Leaf	Bath; tea	----------
Sp.10/Espinho-cheiroso	To speed up pregnancy	Leaf	Bath	----------
Sp.11/Hortelã-miúda	Abortifacient; flu; stress relief	Leaf	Tea	----------
Sp.12/Sucupira	Abortifacient	Stem (bark)	Tea	----------
Sp.13/Abre-caminho	Spiritual protection	Leaf	Bath	----------
Sp14./Três-primas	Flu	Root; whole plant	Syrup; tea	----------
Sp.15/Batata-de-teiú	Pain in general	Root	Tea	----------

obtaining home remedies in relation to allopathic medicine, both for financial and accessibility reasons, as follows:

> *"O babatenã é quase o principal remédio da comunidade. Por que eu tenho que sair daqui para ir à farmácia comprar um antiinflamatório que custa R$ 20,00, R$30,00, sendo que eu tenho um remédio dentro de casa?"* (Babatenã is almost the main medicine of the community. Why do I have to leave here and go to the pharmacy to buy an anti-inflammatory that costs BRL $ 20.00, BRL $ 30.00, since I have medication at home?)
>
> *"Prefiro remédio caseiro, pois a gente já tá aqui, ter que atravessar (de barco) é ruim".* (I prefer home remedy, because we are already here, and crossing (by boat) is bad).
>
> *"Depende da doença; se for dessas doenças 'besta', a folha é melhor."* (It depends on the disease; if it is of these 'silly' diseases, the leaf is better).
>
> *"Às 'vez' a doença chega de surpresa, aí a gente usa as 'folha'. Mas, se houver opção, nós 'vai' à farmácia."* (Sometimes the disease comes by surprise, then we use leaves. But, if there is an option, we go to the pharmacy).
>
> *"Se for uma coisa que no mato não resolver, é na cidade que eu vou resolver".* (If it is something that does not get resolved in the woods, it is in the city that I will resolve it).

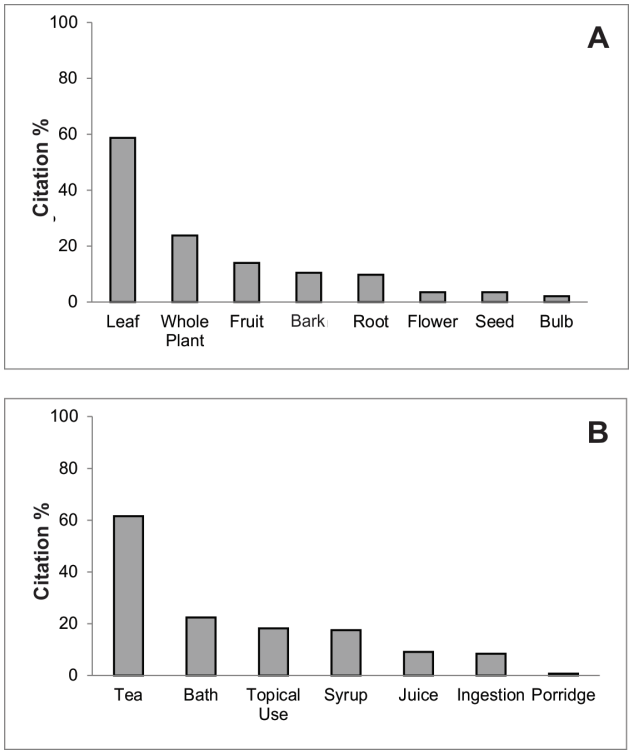

Figure 3. Citation (%) of parts (**A**), forms of use and preparation (**B**) of plants with medicinal use in the Salamina Putumuju Community, Maragogipe, Bahia State, Brazil.

Species richness and socioeconomic factors: gender and age

According to the GLM, only age was significantly associated with medicinal plant knowledge ($F = 10.6406$, $p = 0.0017$), showing that this knowledge base overall grows with increasing years. This increase is most visibly evident in the 18 - 40 years cohorts, becoming more dispersed in later years (Fig. 4). It is also evident that peaks in the number of species mentioned occurs between the ages of 38 and 72 years (Fig. 4). There was no significant association between sex and age ($F = 2.4401$, $p = 0.1228$). On the other hand, women exhibited slightly greater knowledge about the richness of medicinal species (107 *spp.*, 34 % exclusive) compared to men (95 *spp.*, 27 % exclusive), particularly later in life, but these differences were not significant ($F = 0.6128$, $p = 0.4364$) (Fig.4).

Considering the ecological aspects of plants, such as life form ($X^2 = 1.734$, $df = 4$, $p = 0.8313$), origin ($X^2 = 0.0823$, $df = 1$, $p = 0.7742$) in relation to gender (Fig. 5A-B), there were no significant differences in the chi-square tests. However, there is a subtly greater knowledge trend by women in relation to men in respect to herbaceous plants (Fig. 5B). Regarding the forms of management, there was also no significant difference ($X^2 = 0.2550$, $df = 1$, $p = 0.6136$), despite the trend for women to have more knowledge about cultivated plants compared to men (Fig. 5C). The extraction of wild species was overall the most important source for medicinal plants in the community (48 %), whether in the forest, along trails, or spontaneously growing in backyards, followed by cultivation (43 %) (Fig. 5C).

The graph with the eight therapeutic indications that have over ten mentions in the interviews shows that in general there are no gender differences for the commonly cited diseases/symptoms (Fig. 6). However, there is an exception in the case of indications for internal inflammation and immaterial or spiritual problems (interpreted in the community as "crazy body", "charged body" or "removing the evil eye," which had more species cited by women, as well as diabetes, which had more species cited by men (Fig. 6). The most cited immaterial plants were mainly plants cultivated or found near the interviewees' homes, such as backyards or trails. These were: vassoura-mofina (*Scoparia dulcis*), aroeira (*Schinus terebinthifolia*), quioiô (*Ocimum gratissimum*), malva-branca (*Sida* cf. *cordifolia),* manjericão (*Ocimum* sp.), mentrasto (*Ageratum conyzoides*), pinhão-roxo (*Jatropha gossypiifolia*), espada-de-ogum (*Dracaena trifasciata*) and comigo-ninguém-pode (*Dieffenbachia seguinte*).

The report below demonstrates, from a resident's point of view, that some plants are preferred by gender, as in the case of malva-branca and mesca-de-rama: "*Quem pede mais essa mesca-de-rama é mulher. É ela quem mais usa, assim como a purga-de-campo*" (Whoever asks more for "mesca-de-rama" is woman. She uses it the most, as does the "purga-de-campo"). Both are used for internal inflammation, a therapeutic use with greater species richness cited by women in relation to men.

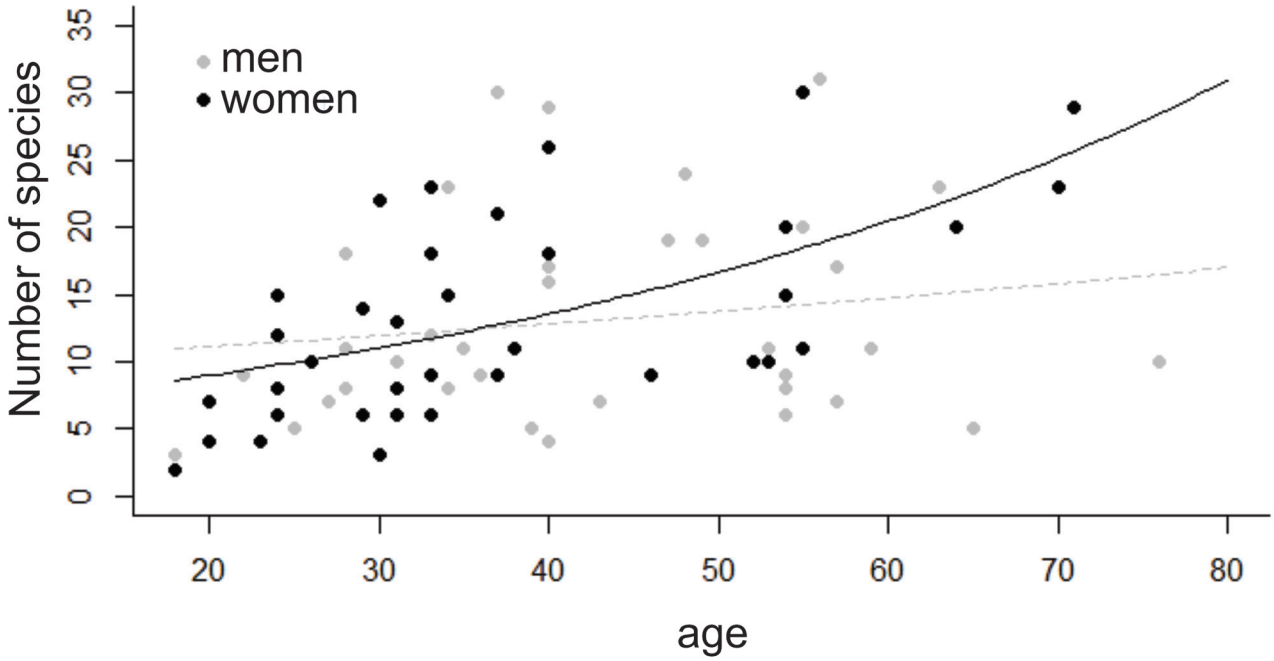

Figure 4. Individual effect of the explanatory variables age and gender (man and woman) on knowledge of plants with medicinal use in the Salamina Putumuju community, Maragogipe, Bahia State, Brazil.

Discussion

Species richness: therapeutic indications, parts used and ways of preparing the plants

The therapeutic arsenal of the Salamina Putumuju *quilombolas* seems to reflect the long period of relative isolation to which the local population was subjected (Santana *et al.* 2016), ensuring greater reliance on medicinal plants than on allopathic remedies. The absence of health posts in the community, added to the scarce number of motorized boats that enable the *quilombolas* to travel by sea to the municipality headquarters (where the clinics are located), is one of the historical and cultural factors that has influenced survival of traditional knowledge about medicinal plants (Silva 2014). In addition, ecological factors such as proximity to the Atlantic Forest are also considered important, as observed in other studies that recorded high medicinal plants richness in communities located in biologically rich tropical rain forests (Hanazaki *et al.* 2000; Begossi *et al.* 2002; Crepaldi & Peixoto 2010; Tuler & Silva 2014).

On the other hand, an ethnobotanical study carried out by Ávila *et al*. (2015) in three *quilombola* communities with different geographic configurations and degrees of urbanization in southern Brazil, demonstrated that the degree of urbanization in this case did not influence the ethnobotanical repertoires among these communities. Even the most urbanized community had a higher record of plant knowledge when compared to the other two. However, this study investigated several uses for plants, in addition to medicinal, and considered the possible exchange of knowledge and plants between these communities due to their close proximity. This could have promoted a homogenization among plant repertories, in addition to the effects of modernization, which began in the 70s, which was much earlier than the changes that occurred in the present study community. Moreover, the predominance of exotic species over natives in these southern *quilombola* communities suggests that the effects of modernization are possibly greater than in Salamina, where the majority of medicinal plant species are natives (see Santana *et al.* 2016).

Therapeutic indications also reflect environmental and historical-cultural aspects. For example, the location in a humid climatic region influences the high incidence of diseases of the respiratory system, and the absence of a sanitary system exacerbates the incidence of diseases of the gastrointestinal and genitourinary system, a feature that is recurrent in other *quilombola* communities as well (Gomes & Bandeira 2012; Silva *et al.* 2012a). Other common therapeutic categories are generalized inflammation, skin and subcutaneous diseases, and general symptoms and signs, when illness does not have a single apparent cause or occurs because of activities carried out in the community, for example the manual extraction of piassava fiber in the forest or the cultivation of foodstuffs (Santana *et al.* 2016).

The characteristic of the plant's habitat is also reflected in healing strategies, such as the inclusion of species of humid and shady environments to treat diseases of the respiratory system in children, including *Peperomia pellucida*, *Kalanchoe pinnata*, and *Ocimum* cf. *basilicum*, classified by the population as "plants to refresh or calm". These *quilombola* classifications have similarities with the hot / cold botanical classification system used by Afro-religious communities (Voeks 1997).

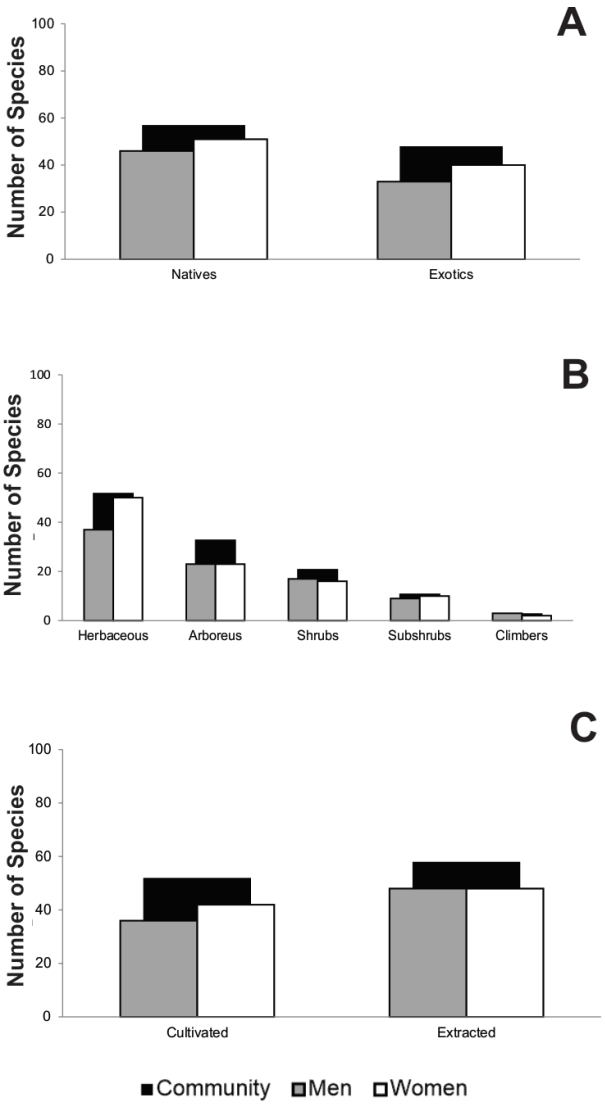

Figure 5. Knowledge of plants with medicinal use in the Salamina Putumuju community, Maragogipe, Bahia State, Brazil, in relation to gender (man / woman): **A** - Number of species cited by biogeographic origin in relation to the genus; **B** - Number of species mentioned by plant habit in relation to genus; **C** - Number of species cited by management methods in relation to the genus.

Therapeutic indications for more contemporary diseases, such as diabetes, hypertension, and stroke, for example, have a significant range of medicinal plant species in the community (Santana *et al.* 2016). This is less true for recurrent disease categories (gastrointestinal, respiratory problems, etc.), indicating that the local population probably treats these illnesses by complementing or alternating the use of local plants with western medicine. Generally, the combination of traditional and allopathic therapies occurs when illnesses are uncommon and when the use of plants alone does not alleviate the symptoms (Silva 2014). But it also seems to reflect logistical or financial difficulties, or lack of regular medical assistance in health centers, which encourages residents to rely on home remedies that are available and readily accessible (Kutal *et al.* 2021).

This preference for medicinal plants at the onset of the first symptoms was also recorded in other studies, in rural and urban communities (Wayland & Walker 2014; Alqethami *et al.* 2020; Rahayu *et al.* 2020). In addition to questions of availability and accessibility, the belief that medicinal plants are safe and effective is important in maintaining the coexistence of traditional and allopathic medicine (Rahayu *et al.* 2020). Moreover, the maintenance of traditional medicine strengthens cultural identity, being a way to confront the homogenizing dominant medical system, in addition to reflecting on the subsistence and conservation of local systems (Zank & Hanazaki 2017).

Infusion is the most expressive form of medicinal plant preparation in the community and is also very common in other *quilombola* communities (Monteles & Pinheiro 2007; Gomes & Bandeira 2012; Mota & Dias 2012; Silva *et al.* 2012a; Silva *et al.* 2012b). Syrup, also known as "lick", is used exclusively for diseases of the respiratory system, the most prominent medicinal category in the community (Santana *et al.* 2016).

Baths are also a form of preparation that is relevant for the community, as it reflects maladies related to piassava fiber extraction activities, including dental and skin inflammations such as cuts, wounds, and mycoses. Herbal remedies for dental conditions are important in the community due to the scarce resources of the local population for investment in dental treatments (Silva 2014). On the other hand, herbal baths as an expressive form of preparation seems to reflect the African heritage of plant knowledge for healing (material and spiritual) (Voeks 1997; Crepaldi & Peixoto 2010; Mota & Dias 2012; Silva *et al.* 2012b). This is employed especially by mourners or healers, a function increasingly difficult to be exercised due to the increase in people converted to neo-Pentecostalism, a feature observed in other *quilombola* communities (Crepaldi & Peixoto 2010; van Andel 2010).

Species richness and socioeconomic factors: gender and age

The hypothesis that female members of the community would be the most knowledgeable about medicinal plants was rejected by the results, which failed to show significant differences in knowledge of medicinal plants between men and women. The absence of significant differences in the ecological knowledge of medicinal plants between men and women is something that has been observed in some rural / traditional communities in Brazil (Giraldi & Hanazai 2010; Alencar *et al.* 2014) as well as in other countries (Souto & Ticktin 2012; Muller *et al.* 2014).

The gendered-knowledge hypothesis was proposed in this study, however, because an earlier study in the community reported differences in gender in relation to subsistence, economics, and homecare activities (INCRA 2006; Martins

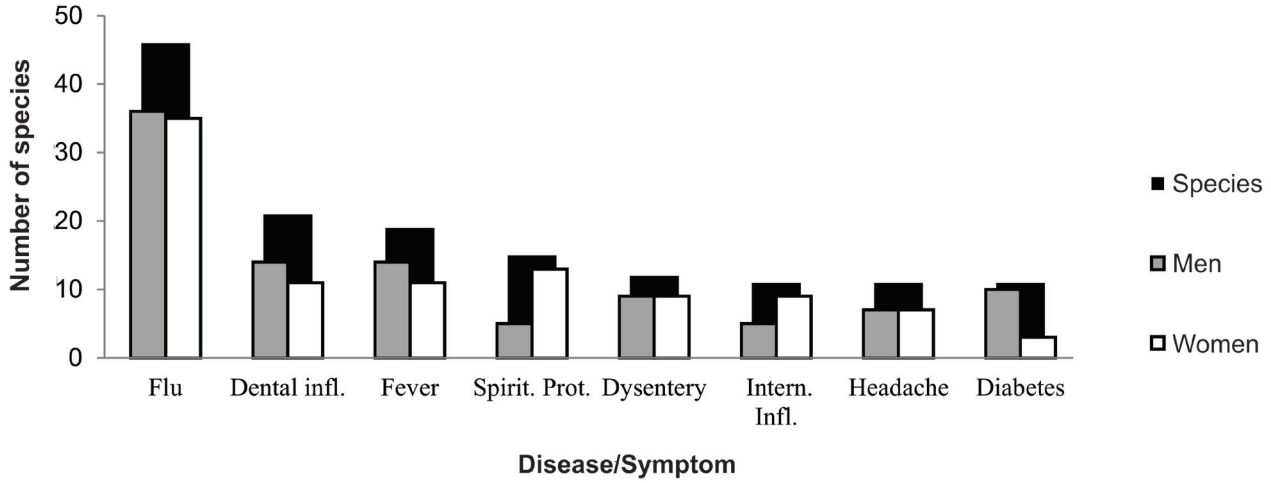

Figure 6. The knowledge of the use of medicinal plants by gender (man / woman): therapeutic indications with greater species richness in the Salamina Putumju community, Bahia, Brazil. Abbreviated symptoms/diseases are: Dental inflamation, spiritual protection, and internal inflammation.

2014). Men are responsible for the collection of piassava in the forest, whereas the later separation into fiber classes, a process called 'picking', is carried out in large measure by women and children (Martins 2014). Men are also mostly responsible for planting and collecting from the fields, which are generally close to their residences and of small scale, as well as for fishing and for piloting the boats, especially for community transport (Martins 2014). In the case of women, caring for the home and children spatially restricts their relations with nature, except for shellfish collection, which is an alternative and gendered form of subsistence (Martins 2014). Furthermore, backyards are where most of Salamina's medicinal plants occur (about 84%, see Santana *et al.* 2016), and many women's activities are associated with these anthropogenic spaces.

In this particular case, the division of space and activities by gender does not seem to influence overall knowledge of medicinal plants. However, although men are the collectors of medicinal plants that inhabit forests that are further away from the residence or difficult to access, such as barbatimão (*Stryphnodendron* cf. *adstringens)*, mesca-de-rama (*Mikania* sp.) and cortiça (not identified), women are more knowledgeable about the uses, applications, and ways of preparing these plants. This is also the case with the plants that are used to treat diseases of the female reproductive system, abortifacients, and common diseases in children, which are also known by some men, such as purga-do-campo (*Pombalia calceolaria)* for vaginal inflamation, papai-nicolau (*Coutoubea spicata)* as an abortive, boticudo (*Acanthospermum* cf. *hispidum*) and alfavaquinha-de-cobra (*Peperomia pellucida),* both for fevers in children (Tab. 1).

Torres-Avilez *et al.* (2016), in a systematic review and meta-analysis of gender as a variable in the knowledge of plants at global, continental, and national scales, observed that gender differences occurred only at smaller and non-unidirectional scales, which may or may not favor a specific gender in a community. The authors suggest that there is heterogeneity in labor division strategies, both for medicinal use and for other plant resource uses, and that these strategies can be influenced by other sociocultural variables, making it difficult to generalize about the role of gender in the knowledge and use of plant (Torres-Avilez *et al.* 2016).

Considering the multifaceted and fluid perspective of the social roles that genders can play in a community (Pfeiffer & Butz 2005), men in Salamina are indeed as knowledgeable about organic health care as women. However, it is necessary to consider other more specific cultural factors that may be interacting with gender in the community but which were not analyzed. These include cultural taboos that influence norms and beliefs, specific modes of knowledge transmission by gender, social networks differentiated by gender, gender differences in access to natural resources, among others (Pfeiffer & Butz 2005).

A gendered difference in knowledge that did appear in Salamina was in regard to plants used for supernatural/spiritual diseases. The women in this study revealed a greater repertoire of species for the purpose of spiritual protection, indicating that the protection of family health operates both in the material and non-material realms, as also observed in a traditional community in Borneo (Voeks & Nyawa 2001). Indeed, religion is often a crucial factor to consider in the significance and use of medicinal plants. For example, the medicinal and spiritual value of myrtle (*Myrtus communis* L.), basil (*Ocimum basilicum* L.), rosemary (*Rosmarinus officinalis* L.), and Greek sage (*Salvia fruticosa* Mill.) are deeply engrained in the practice of Judaism, Islam, and Christianity (Dafni *et al.* 2019). In Jeddah, Saudi Arabia, considered an important gateway for Muslim pilgrims to sacred cities like Mecca and Medina, Alqethami *et al.* (2020) showed that many medicinal species carry a certain sacred status as "Prophetic medicine."

This connection between religion and healing plants has also been demonstrated among African-derived religious practices in Brazil, in which a large portion of medicinal species are associated with one or another of the orixás (Voeks 1997; Serra *et al.* 2002). In this study healing species employed for spiritual purposes include aroeira (*S. terebinthifolia*, in Yoruba "Àjóbi Pupa"), attributed to the orixás Iansã and Ogum and widely used for cleaning and flushing baths, as well as quioiô (*Ocimum gratissimum* in Yoruba "Èfínrín"), attributed to the orixás Oxóssi, Xangô and Ogum, and which are used for cleaning and flushing baths, and to remove the evil eye and diseases without a clearly defined origin (Almeida 2011). There is an additional gendered dimension to this association in Brazil, as women often play a leading role as priestesses and founders of Candomblé houses where African-derived, spiritual healing practices are featured (Landes 2002).

These cultural associations between African-derived spirituality and medicinal plant usage are, however, changing rapidly in Salamina Putumuju. Although a Candomblé terreiro existed in the community in the past, this was something barely mentioned in the interviews (INCRA 2006), probably because most residents have converted to neo-Pentecostalism. There has been a steady decrease in the number of healers according to some residents. Although previously common in the community, healers were discouraged from practicing any prayers and cures associated with Candomblé. And some chose to not self-identify as plant specialists or as healers, in spite of the fact that they cited a large number of medicinal species.

The significant increase in knowledge of medicinal plants with age is a pattern that has been noted in many traditional communities (Silva *et al.* 2012b; Conde *et al.* 2017; Pérez-Nicolás *et al.* 2017), especially with women (Voeks & Nyawa 2001; Begossi *et al.* 2002; Voeks 2007). Although the effect of gender alone was not significantly associated with medicinal plant knowledge in this study, women tended to accumulate more knowledge with age than their male counterparts (Fig. 4). This phenomenon has similarly been noted among *mestizo* communities in Venezuela (Souto & Ticktin 2012).

The apparent increase in knowledge in this study between the ages of 18 and 40 may reflect the lack of interest of young people in learning about the uses of medicinal plants, or it may simply be a reflection of the time required to learn about plant resources (Quinlan & Quinlan 2007). The notion that erosion in knowledge is necessarily occurring in traditional communities has been questioned (Albuquerque *et al.* 2011; Vandebroek & Balick 2012). These studies do not necessarily support the expectation of loss of ethnobotanical knowledge, but rather associate their findings to differences in cognitive domain between age classes due to the time of interaction with resources (Voeks & Leoni 2004), memory (Albuquerque *et al.* 2011), and the contingencies in space and time that act on the ethnobotanical repertoire. Indeed, even determining what baseline botanical knowledge is "traditional" can be challenging because traditions are subject to change over time (Voeks 2018), and because intracultural variations concerning the uses and knowledge of plants in a community can be very idiosyncratic (Vandebroek 2010). Finally, as pointed out by Bussmann *et al.* (2018), the recognition of ethnobotanical erosion in some studies may simply be a function of sampling error.

Conclusion

The Salamina Putumuju community deploys a considerable arsenal of herbal plant-based treatments for health issues. Principal illnesses, including flu, fever, dental inflammation, dysentery, inflamation, wounds, and headache, are treated with medicinal plants, reflecting the importance of traditional medicine in the primary care of common maladies. Accessibility and availability of plants seems are important factors in explaining species preference, underscoring the prevalence of herbs and subshrubs collected from anthropogenic environments, including backyards or trails, ruderal or cultivated. Several cultivated backyard shrub / tree species are used for both food and medicine, including cashew, cherry, rose apple, blackberry, papaya, mango, guava, orange, and acerola (see Santana *et al.* 2016). Residents reported that in the past community members were forbidden from growing these plants, which kept their ancestors even more dependent on earlier landowners. This ban was gradually diminished, and today these species are an important food and medicinal resource in the community (see Santana *et al.* 2016). Plants used for spiritual healing and prophylaxis appear to reflect African-derived traditions.

This study contributes to the ongoing discussion of the role of gender and age in the knowledge and use of plants, particularly in Afro-descendant communities. Increasing age is associated with increasing knowledge of the community's medicinal flora, although the role of gender is less obvious. Other variables need to be analyzed more comprehensively to assess globalizing influences. There is a need for a temporal analysis in the Salamina community to better understand the dynamics of traditional medicinal plant knowledge over time.

Physical and socio-cultural isolation has encouraged retention of traditional plant knowledge in this community, while increasing contacts with the greater outside world are encouraging new and novel areas of plant knowledge. Because Salamina was one of the first *quilombola* communities in the region to obtain land titling, there is a recent investment process in projects aimed at improving the population's socioeconomic conditions, and this may well influence traditional botanical knowledge.

Acknowledgments

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