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# Culture-Bound Syndromes of a Brazilian Amazon *Riverine* population: Tentative correspondence between traditional and conventional medicine terms and possible ethnopharmacological implications

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## A B S T R A C T

**Ethnopharmacological relevance:** It is not always possible to correlate the “emic” terms to the “etic” ones during ethnopharmacological surveys, especially regarding those related to Culture-Bound Syndromes (CBS). Nevertheless, it is the role of ethnopharmacology to address these correlations, since they are the basis for the understanding of potential bioactives.

**Aim and objectives:** This study reports the clinical manifestations and therapeutic resources used for the treatment of CBS among some riverine inhabitants of Brazilian Amazonia. An effort was made to establish a correspondence between the local “emic” terms of traditional medicine and the symptoms or diseases known by conventional medicine (“etic” terms). The ultimate goal was to gain insights to suggest further pharmacological studies with the local resources.

**Material and methods:** Fieldwork was guided by methods of anthropology, botany and zoology—with the assistance of a doctor—among the traditional healing experts in Jaú National Park (during 199 days in 1995) and Unini River Extractive Reserve (210 days from 2008 to 2012).

**Results:** Fifty-nine healers of different kinds were interviewed: a prayer-maker, medium, natural resource expert, massage therapist, midwife and snakebite healer. The clinical manifestations and healing resources of the following CBS were collected: “mau olhado” (evil eye), “quebrante” (chipping); “espante” (fright or *susto*); “doença do ar” (air diseases); “vento caído” (fallen wind); “derrame” (leakage); “mãe do corpo” (mother of the body) and “panema” (unlucky). The first three seem to be local variations of other CBSs already described in Latin America. “doença do ar”, “vento caído”, “derrame” and “mãe do corpo” seem to be folk terms for known conventional medical disorders, while “panema” is a yet undescribed Brazilian CBS that is possibly related to dysthymic disorder or depression and deserves further investigation. Treatments included prayer rituals, fumigation, baths and oral remedies using 25 plants and 10 animals.

**Conclusion:** It was possible to establish hypothetical correlations between CBS as described by the riverine population studied and some “etic” terms. The main importance of this is to help the proposition of target-oriented pharmacological studies of the natural resources used by these communities. Accordingly, the following plants are suggested to be submitted to further studies for antidepressant and anxiolytic activities: *Siparuna guianensis*, *Mansoa alliacea*, *Leucas martinicensis*, *Petiveria alliacea*, *Annona montana* and *Alpinia nutans*; for anti-seizure activity: *Protium amazonicum*, *Protium aracouchini* and *Protium heptaphyllum*; finally for antispasmodic activity: *Leucas martinicensis*.

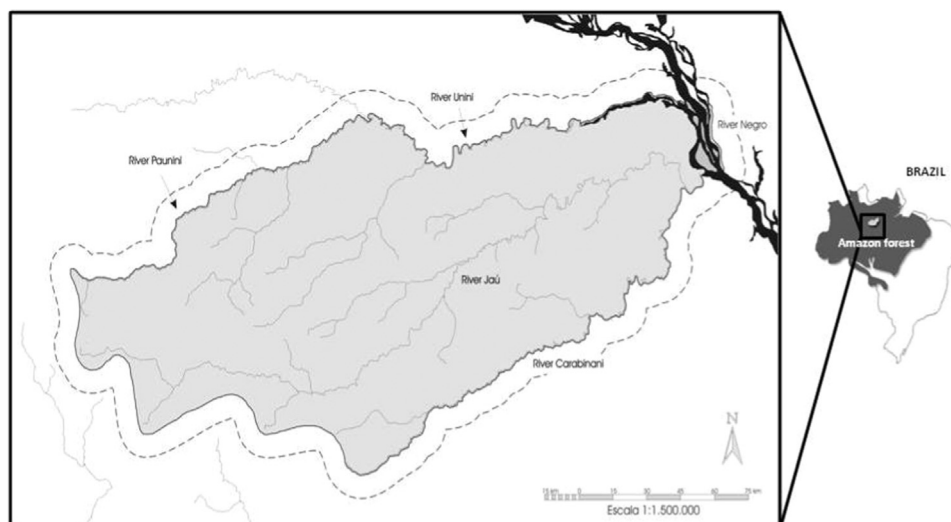
## 1. Introduction

The ultimate goal of ethnopharmacology should be to identify drugs that alleviate human illness via a thorough analysis of plants alleged to

be useful in human cultures throughout the world (Farnsworth, 1990). Brazil is home to the largest vegetable biodiversity worldwide, estimated at approximately 20% of the total plant species on the planet. (Giulietti et al., 2005). Brazil also holds several semi-isolated popula-

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**Fig. 1.** : The Unini and Jáú Rivers located in the River Negro basin, Amazon forest, Brazil, between the municipalities of Novo Airão and Barcelos.  
Source: Rodrigues (2006).

tions that developed their own traditional medicines. This vast genetic and cultural heritage is a potential source of new drug candidates.

Culture-Bound Syndromes (CBS) are widespread among Latin American populations. These are recognized and treated by traditional cure experts with the local resources available. Some of their clinical manifestations may also be recognized by doctors of the conventional medicine. This provides insights to propose tests on pharmacological targets.

CBSs were formerly described as a heterogeneous collection of folk terms, some describing true syndromes and others representing culturally determined notions of disease causation or idioms of distress (Levine and Gaw, 1995). They are reported among various human groups in Latin America, Central America and West Africa (Aina and Morakinyo, 2011; Weller et al., 2002). They have been associated with psychiatric disorders, especially in mood and anxiety (Cintrón et al., 2005; Guarnaccia et al., 2005). Examples include ‘ataque de nervios’ (Guarnaccia et al., 1999) in Latin America and neurasthenia (Kleinman, 1978) in China. In many cases, clinical manifestations are linked to mental or psychiatric conditions whose occurrence is influenced by cultural factors (Tseng and Wen-Shing, 2006). For example, among Cambodian refugees, *khyâl* attacks may express a culturally specific experience manifestation of Post-Traumatic Stress Disorder (Hinton et al., 2010).

These syndromes were included in the fourth edition of “Diagnostic and Statistical Manual of Mental Disorders” (DSM IV) (American Psychiatric Association, 1994) of the American Psychiatric Association after considerable effort by medical anthropologists (Guarnaccia et al., 1999; Kleinman, 1978; Prince and Tchong-Laroche, 1987; Yap, 1965). These authors argued that culture influences the way in which people cope with distress and shapes concepts in psychopathology. Therefore, to be universal, the description of psychiatric disorders shall include cultural standards other than those of Western countries. By definition, cultural idioms of distress would be semantically and pragmatically effective and largely nonstigmatized ways of communicating distress, of which psychiatrists should be made aware (Nichter, 2010).

The fifth edition (DSM-V) changed this concept in favor of Cultural Concepts of Distress and included the Cultural Formulation Interview (CFI), a 16-item questionnaire aiming at the incorporation of cultural elements in psychiatric assessment (Lewis-Fernández et al., 2014). Through CFI, DSM V reinforced the value of communitarian and individually constructed identities on the perception and expression of psychic symptoms.

In traditional communities, these psychic symptoms are managed

by several means, including some with possible pharmacological activity. The correlation between the “emic” terms used by the local populations, with their correspondent “etic” terms and the natural resources used for their healing, may give insights to guide further pharmacological studies. One main role of ethnopharmacology is to address these correlations, since they are the bases for suggesting the potential bioactivity of these resources.

This study reports the clinical manifestations and therapeutic resources used for the treatment of CBS among some *riverine* inhabitants of Brazilian Amazonian. An effort was made to establish a correspondence between the local “emic” terms of the Traditional medicine (“etic” terms). The ultimate goal was to get insights to suggest further pharmacological studies with the local resources. Two questions guided this study: 1- Based on the natives’ conceptions and the clinical observations made by a physician on these CBS, is it possible to establish correlations between them and symptoms or diseases recognized by the conventional medicine? 2- Among the natural resources used by this population, are there any that could be considered promising for further pharmacological investigations due to targeting symptoms or diseases known to conventional medicine?

## 2. Materials and methods

### 2.1. Areas visited

Two permanent preservation areas located in the Middle Negro River basin in the Brazilian state of Amazonas were visited: Jáú National Park [1°90' S; 61°25' W] and the Unini River Extractive Reserve [1°40' S; 63°48' W] (Fig. 1). Both are Federal Conservation Units aimed at sustainable extraction of natural resources with minimal environmental impact.

Both regions share similar physical and human features. Both are located within the Amazon biome and have the rivers as the only means of transportation. The nearest city is 250 km away and requires several days to be reached by boat. Heavy rains falling from December to April raise the water level by up to 15 m and spread floods throughout large areas. Humans inhabit small communities at elevated and permanently dry spots dispersed throughout hundreds of kilometres at the riverside.

### 2.2. Population studied

The “*ribeirinhos*” (*riverine*) are a mestizo population that speaks

Portuguese and is part of the historical Amazon peasantry. Their formation started in the eighteenth century, with the arrival of the first Europeans to the region, who mixed with the Amazonian Amerindians (Chibnik, 1991; Leonard, 1998; Parker, 1985).

In the nineteenth century, the *Negro* river basin attracted workers from northeastern Brazil to extract latex from the rubber tree (*Hevea brasiliensis* Müll. Arg). These migrants were descendants of Europeans intermingled with African and northeastern indigenous people who further amalgamated with indigenous Amazonians (Chibnik, 1991). They practice the indigenous techniques of planting, fishing and hunting (Brondizio and Siqueira, 1997). The European root incorporated Christianity into indigenous religious rituals (Galvão, 1951).

The two areas studied have approximately 1000 inhabitants each, dispersed in several communities of 30–200 people each. They share the same therapeutic natural resources and healing practices, since marriage and kinship ties connect them. Communities' members often travel to visit each other, remaining for days or weeks, thus mingling their cultural heritages. This creates an interconnected and coherent cultural set. These people have incorporated habits, technologies, knowledge and values from all ancestors, having the geographical isolation to protect their cultural heritage. This allowed us to consider them as a single ethno medic group, visited on two different occasions, approximately 15 years apart.

They extract nuts, vines and other forest products, monitored by government authorities. Most communities have at least one layman cure specialist, and some have a midwife who is also frequently a cure specialist. No certified doctor regularly visits any of these communities. Instead, the government trained a few laymen to diagnose and treat malaria, which was responsible for many casualties in the recent past.

Christian missionaries, predominantly Protestants, are present in many communities. Some of them go to the province's capital (Manaus) 2 or 3 times a year to report to their superiors. A one-way boat trip demands 5–8 days. These areas are also regularly visited by merchants who buy forest products and sell grains, clothes, diesel fuel and other industrialized goods.

### 2.3. Data collection

The communities of Jaú National Park and Unini River were visited tree times totalling 199 days in 1995 by Rodrigues, E. At that time, the focus was on the inhabitants from Rio Jaú (Rodrigues, 2006). The Unini River Extractive Reserve was visited seven times totalling 210 days from 2008 to 2012, by Santos, J.F.L., Rodrigues, E and Pagani E. (Santos et al., 2012).

The necessary permits per Brazilian regulations were obtained before the fieldwork (SISBIO 16805-2, CGEN/MMA 47/2009, CEP-UNIFESP/EPM 056/00 and CEP-UNIFESP/EPM 1354/08). This included not only governmental but also the community's authorization after a detailed explanation of the research purposes and methods. The authors then lived within the communities for weeks or months in all visits and sometimes shared meals with the interviewees. This approach established the mutual trust that allowed the information to be exchanged.

The healers interviewed were recruited by "snowball" sampling. The community members indicated the first people skilled in healing practices. Each interviewee then suggested others, who were also legitimated by the community. This process was saturated when all new indications were of people already identified. This allowed the complete sampling of all healers recognized by these small communities (Bernard, 1988). One of the authors (Pagani, E.) is a medical doctor who visited the communities to find similarities between the cultural syndromes and officially recognized signs, symptoms or diseases. An effort was made to "translate" such data into terminology used by conventional medicine ("etic" data).

Ethnographic methods included interviews, participant observation, checklists and field diaries (Alexiades, 1996; Bernard, 1988;

Footo-Whyte, 1990). The interviews were unstructured and informal, with special care to ensure mutual trust and stimulate the interviewees' spontaneous conversation (Bernard, 1988; Viertler, 2002). This free dialogue allowed the respondents greater control of the information that they wished to convey. The more the respondent was allowed to speak for himself, the more we were exposed to his vision of the world, diseases and healing (Posey, 1987; Souza et al., 2013; Viertler, 2002). The authors did have a written list of issues to discuss. These included personal data (origin, family and experience) and ethnopharmacological questions on healing practices (plants and/or animals used, parts of them used, formula, route, dose, associated rituals). Each interview took at least a few hours but in some cases took several days and different visits to resolve doubts or address new questions. Authors and interviewees walked together in the forest to see *in loco* the resources used in the cure.

Field samples of plants used in the healing practices were collected, stored and identified by specialist scholars (Rodrigues, 2006; Santos et al., 2012). Most animals cited in the formulas were collected by the riverine themselves during other projects with INPA researchers (*Instituto Nacional de Pesquisas da Amazônia*). Thus, the animals mentioned here were identified by their vernacular names, which were later changed to their scientific names. Two alligators were collected by us and identified by INPA researchers; their voucher numbers are listed in Table 2.

### 2.4. Data compilation and analysis

The data obtained from interviews, observations, and field diaries were submitted to content analysis, condensed and coded, facilitating the meeting of thematic categories in the data obtained (Huberman and Miles, 1994). Thus, the descriptions of syndromes and healing practices were compared among responders, looking for consensus. This was easily obtained in most cases, showing cultural homogeneity among responders. Whenever significant differences were found, new contacts were made with some interviewees to ensure that the authors understood what was said. In most instances, the responder fixed misunderstandings, leading his report to match the majority. In a few instances, the responder maintained his report against the majority. In this case, the authors kept the individual report to show a different view of the same subject.

## 3. Results

### 3.1. Types of healers

A total of 59 healers were interviewed—26 at Jaú National Park and 33 at the Unini River Extractive Reserve. They were placed in seven categories: 25 "entendidos em remédios do mato" (natural resource experts), 16 "rezadores" (prayer-maker man or woman), 10 "parteiras" (midwives), 5 "desmintidores" (massage therapists), 1 "curador" 1 "curado" (both snakebite healers), and 1 "médium" (medium). Some healers may fall into more than one category.

The prayer-maker is one who prays and blesses with or without the help of accessories, fumigation, baths and herbal remedies. They claim to be intermediaries between the patient and spiritual forces that will promote the cure and/or transmit information about the resources to be used. The medium claims to incorporate spirits that command the rituals and prescribe herbal remedies and other interventions. The natural resource expert merely prescribes natural remedies, neither performing any rituals nor mediating actions of spiritual forces. Massage therapists are laymen who apply massages for back pain, sprains, muscle aches and other ailments. They sometimes use animal or vegetal fats to help the hand sliding. Midwives follow pregnancies and help in childbirth; sometimes they also pray, prescribe herbal remedies and perform cure rituals. They also feel the fetus by palpation and may help with the proper positioning through massages aided by

animal fats. Snakebite healers are people who claim to be holders of a power to cure bites from snakes. The power is a substance in their spittle that may neutralize the venoms.

### 3.2. Becoming a healer

The healing practices are transmitted orally from generation to generation, and most healers reported to have learned by attending sessions held by their parents and close relatives. Most prayer-makers claim to have received a gift from God. Two reported that God contacted them in a dream. Another reported that his mother listened to his crying during pregnancy, which was a sign of God's will.

Natural resource experts are holders of the traditional culture learned from their parents and other community members. Midwives learned from other midwives by following the pregnancies and helping parturitions. Massage therapists learned with others and many times by themselves. The snakebite healers fall into two categories. The “curador” claims to have been born with the gift of healing bites through his spittle. The owner of this power may transmit it to others by spitting in their mouths or in the water that is drunk by the bitten patient. One who receives the spittle in his mouth becomes a “curado” and obtains the gift of healing snakebites.

### 3.3. The sources of the traditional healing knowledge

Four main original sources of the traditional cultural knowledge forming the communities' knowledge on healing have been identified: 1) *Cultural heritage*: the studied population is mainly formed by migrants who brought their former cultural heritage that created the base of their traditions; 2) *Information received by the healers within cure rituals*: new information is constantly added after insights received during prayers or mediunic trances. The origin of this information is attributed to the spiritual world; 3) *Modifications introduced by the local healer*: some healers reported to have introduced some variations on what was prescribed in rituals or known from the traditions. In some cases, this was due to the temporary lack of the original resource and substitution by others that were supposed to hold the same healing properties; and 4) *External influences*: community members travel to urban centres, visit doctors of the conventional medicine, are informed about their diagnosis and receive prescriptions that are constantly incorporated into the common knowledge and spread to the communities. Moreover, missionaries and any kind of visitors, including merchants and researchers, interact with the communities and provide new information and references that may be incorporated into the local culture. More recently, satellite TV has provided an enormous source of concepts in health and cures. This is a strong and potentially harmful source of new information added to the traditions.

### 3.4. Description of the culture-bound syndromes by the interviewees

Table 1 describes the “emic” terms, affected population, signs and symptoms, causes, and therapeutic resources related to CBS, according to reports of 59 interviewees from the Unini and Jaú rivers. A hypothetical correspondence between “emic” terms from CBS to conventional medicine terms (“etic” term) is presented. Also, ethnographies illustrate the complexity and richness of the information provided by the interviewees in relation to CBS.

### 3.5. Description of therapeutic resources

#### 3.5.1. Prayers and blessings

Prayers evoking Jesus Christ, the Virgin Mary and Catholic saints are the core of many cure rituals. These are the vehicle for achieving insights about the diagnosis, prognosis and cure resources to be used. They are also the vehicle for blessings with cure powers that do not

depend on any additional resource. Most prayers come from the Catholic liturgy, while others evoke spirits from ancestors or natural elements such as the sun or the moon. Prayer rituals may last hours or days and be performed with or without the aid of accessories, baths, fumigation and herbal remedies. Some prayer-makers and medium healers perform rituals with the help of plant branches, mainly ‘vassourinha’ (*Scoparia dulcis* L. - Scrophulariaceae), that are shaken above the patient's head, body and affected areas, sometimes touching them. According to the interviewees, their role as healers is just to intermediate the actions of spiritual forces upon the patient.

### 3.6. Natural resources

In many cure rituals, natural resources such as plants and animal parts are used in teas, baths and fumigations, alone or in combinations. It is common for healers to possess a medicinal garden and a stock of animal parts and plants. Details about the twenty-five plants and ten animals utilized as medicines are described in Table 2. Several animal parts are stored for healing purposes including skins, furs, leathers, feathers, scales, greases, bones, teeth, hooves, paws, horns and insect tusks. Native plants are harvested from the wild or cultivated near the healer's houses. A small medicinal gantry with exogenous species is frequently cultivated in barrels or old boats filled with soil and kept elevated to protect the contents from floods and domestic animals.

### 3.7. Baths

Baths are aimed to calm or clear bad energy. After the plants are boiled in water, the pot is removed from the fire and left to cool. When the temperature is suitable, the mixture of water and plants is thrown on the body. In some cases, there are specific rules for harvesting fresh herbs at dusk, grinding them by hand and soaking them in water. Some preparations must remain outside overnight, and the bath is taken in the dawn, before sunrise. In some cases, there are specific instructions for praying before and after the baths.

### 3.8. Fumigations

The fumigations are frequently used in the healing rituals for cleansing or protection. They may protect a home from the evil or a person from the animals before entering the jungle. Plants, resins and animal parts are burned in several kinds of containers, including clay pots, metal cans, thick leaves and turtle hulls. The smoke is spread around the patient's body or house while the healer prays. In some cases, the patient's skin is previously smeared with crocodile fat (*Paleosuchus trigonatus* or *Caiman crocodilus*) to enhance the smoke's effects, as explained by the interviewees. Sometimes pots are left in a house's corner for protection purposes.

### 3.9. Changes noticed over time

Several changes could be noticed over time in the communities of both rivers (Jaú and Unini). The communities that in the first visit (1995) seldom had battery-operated radios are currently provided with school, diesel-powered generators and TV.

In the last 10 years, several classes of conventional medicines, such as anti-inflammatories, antibiotics and anti-hypertensives, were made available by the government for sporadic or continuous use, even without medical prescription. This produced more evil than good. With the aim of giving an isolated population access to life-saving medicines for urgent cases, this action increased the inappropriate use of antibiotics, which may lead to bacterial resistance.

Recent vaccination programmes against yellow fever, smallpox, tetanus and hepatitis, especially when associated with educational actions to improve hygiene, dramatically reduced the incidence of diseases and several CBSs. In the first visit, each family had at least one



**Table 1**  
Description of “emic” terms, affected population, signs & symptoms, causes, therapeutic resources related to CBSs according to 59 interviewees from the Unimi and Jaú rivers. The possible correspondence between the “emic” terms from traditional medicine with signs symptoms or diseases known by the conventional medicine (“etic” term) is mentioned together with references syndromes.

CBS - Emic term Portuguese (English)	People Affected	Signs & Symptoms	Causes	Therapeutic resources	Hypothetical correlation to conventional medicine (Etic term)	CBSs reported at other studies
“Mau-olhado” (evil eye)	Babies Children Adults	Drowsiness, loss of appetite, vomiting, diarrhea, sagging eyes, fever and greenish diarrhea.	Caused by the gaze or touch of an envy or hungry person, or by the look of admiration, without any bad feelings.	prayers, blessings and baths.	Acute Gastroenteritis	Baer et al. (2006); Berger (2012); Bohigian (1997); Maciél and Guarim Neto (2006); Wawzyniak (2012); Weller and Baer (2001); Weller and Baer (2002). Maciel and Guarim Neto (2006);
“Quebrante” (chipping)	Babies Children Adults	Drowsiness, loss of appetite, vomiting, diarrhea, sagging eyes, fever and greenish diarrhea.	Caused by the gaze or touch of an envy or hungry person, or by the look of admiration, without any bad feelings.	prayers.	Acute Gastroenteritis	
“Espante” (fright or 'susto')	Babies	Fever, agitation, dizziness, crying and scared face. Impairments to sleep and hunger. Weight loss may also occur.	Caused by a frightening event, such as a shout, a threat or a fall from the net (used as bed) or by an enchantment where a “boto” (the Amazonian river dolphin) or a water snake have stolen the patient’s shadow.	prayers, blessings and sympathetic magic.	Could be a normal baby’s behavior or a viral infection, if fever is noticed.	Landy (1985); Moon (1984); Poss and Jezewski (2002); Quinlan (2010); Rubel (1964); Thomas et al. (2009); Weller et al. (2008).
“Doença-do-ar” (air diseases)	Children	fever, consciousness fluctuation, groaning, disconnected speech, head and neck ache, twists and tremor, convulsions, drooling and vomiting. There are four kinds according to the color that appears in some areas of the skin: 1. the black with muscular spasms and contortions. It is potentially fatal; 2. the red; 3. the green and 4. the yellow.	Come with the wind or a frightening event. Decreased incidence with vaccination.	The same treatments are used for all kinds: baths and fumigation with vegetables and animal parts accompanied by prayers.	Black = Tetanus; Red= Measles Green or Yellow = Viral hepatitis with jaundice. Several other hypothesis apply including: peripheral thrombosis, yellow fever, malaria, leprosy and bacterial or fungal skin infections.	Bourbonnais-Spear et al. (2007).
“Vento-caído” (fallen wind)	Babies Children	drowsiness, agitation, crying, vomiting and diarrhea, sometimes with greenish stools	Come with the wind	Prayers and baths with plants decoctions/ infusions.	Acute Gastroenteritis	Fraxe (2004); Teotônio et al. (2015); Viegas (2007).
“Derrame” (leakage)	Adults	Motor deficits, loss of consciousness, involuntary movements, twits, stiff neck and fever. Some forms occur in episodes and return to normal whereas others are characterized by permanent impairments.	Caused by “the air” is the adult correspondently of the “doença do ar” that affect children. The incidence decreased in the last decades	Prayers, fumigation, alcoholic beverages, plants decoctions and animals.	Miscellaneous neurologic diseases including: stroke, seizures, Bell’s palsy, and others with neurologic manifestations	Amorozo and Gély (1988); Costa- Neto (2000); Moura and Marques (2008).
“Mãe-do-corpo” (mother of the body)	women after parturition	Abdominal pain and movements that occur after childbirth; or pain in the back and other body regions.	A “flesh” located besides the fetus and near the navel that awakes after childbirth. After the childbirth, the “mãe do corpo” starts moving in search of the fetus and this causes pain. May occur spontaneously without any presumed cause or be transmitted by another person, willingly or not. It is often attributed to a pregnant woman desiring something or a man that does not share its hunting or fishing with others in the community.	Prayers and baths with animals and plants decoctions.	Postpartum physiological uterine contractions and/or colonic gases	Kalimowski et al. (2010); Maués and Villacorta (2001); Stefanello et al. (2008).
“Panema” (contaminated, unhealthy, unlucky)	Mainly adults May happen in children	Apathy, pessimism and expectation of bad luck over all daily activities and relationships. Men are unable to hunt or fish. Can last for days, weeks or even years and spread to the entire home group.		Baths with plants decoctions.	Depressive disorder	Fleischer (2007); Galvão (1951); Wawzyniak (2012).

**Table 2**

Twenty five plants and ten animals used in therapeutics related to CBSs, their families, species, vernacular names and geographical origin (native or exotic to Brazil).

PLANTS				
Family	Species (vouchers)	Vernacular names	Native (N) x Exotic (E)	CBS in which it was mentioned in our study
Annonaceae	<i>Annona montana</i> Macfad. (Rodrigues 103; Santos 381)	Araticón	N	“Panema”
Apiaceae	<i>Eryngium foetidum</i> L. (Rodrigues 115)	Chicória	N	“Doença-do-ar”
Asteraceae	<i>Pectis elongata</i> Kunth (Rodrigues 71)	Cominho	N	“Doença-do-ar”
	<i>Tanacetum vulgare</i> L. (Rodrigues 50)	Pruma	E	“Mãe-do-corpo”
Bignoniaceae	<i>Mansoa alliacea</i> (Lam.) A.H. Gentry (Santos 388)	Cipó-alho	N	“Doença-do-ar”, “espante”, “vento caído” and “derrame”
Burseraceae	<i>Protium amazonicum</i> (Cuatrec.) Daly (Santos 413)	Breu-branco	N	“Derrame” and “doença do ar”
	<i>Protium aracouchini</i> Marchand (Santos 404)	Breu-preto	N	“Derrame” and “doença do ar”
	<i>Protium heptaphyllum</i> (Aubl.) Marchand (Santos 458)	Breu-preto	N	“Derrame” and “doença do ar”
Crassulaceae	<i>Bryophyllum pinnatum</i> (Lam.) Oken (Rodrigues 8)	Pião-Branco	E	“Doença-do-ar”
Dilleniaceae	<i>Dolioscarpus</i> sp. (Santos 423)	Cipó-d'água	–	“Derrame”
Fabaceae s.l.	<i>Copaifera guyanensis</i> Desf. (Rodrigues 77)	Copaíba	N	“Doença-do-ar”
Lamiaceae	<i>Aeollanthus suaveolens</i> Mart. ex Spreng. (Rodrigues 42)	Caatinga de Mulata	E	“Doença-do-ar” and “Mãe-do-corpo”
	<i>Leucas martinicensis</i> (Jacq.) R.Br. (Santos 355)	Catinga-de-mulata	E	“mãe-do-corpo”, “espante” and “doença do ar”
	<i>Mentha</i> sp. (Rodrigues 3)	Hortelã	–	“Vento-caído”
	<i>Pogostemon cablin</i> (Blanco) Benth. (Rodrigues 35)	Oriza	E	“Mãe-do-corpo”
Monimiaceae	<i>Siparuna guianensis</i> Aubl (Rodrigues 84; Santos 350)	Capitiú	N	“Doença-do-ar”, “espante”, “vento caído” and “derrame”
Pedaliaceae	<i>Sesamum indicum</i> L. (Rodrigues 74)	Gergelim	E	“Doença-do-ar”
Phytolaccaceae	<i>Petiveria alliacea</i> L. (Rodrigues 49; Santos 380)	Mucurá-caá	E	“Derrame” and “doença-do- ar”
Poaceae	<i>Cymbopogon citratus</i> (DC.) Stapf (Rodrigues 25)	Capim-santo	E	“Vento-caído”
Rutaceae	<i>Ruta graveolens</i> L. (Rodrigues 51)	Arruda	E	“Doença-do-ar” and “Mãe-do-corpo”
Selaginellaceae	<i>Selaginella conduplicata</i> Spring (Santos 373)	Samambainha	N	“Mãe-do-corpo”
Smilacaceae	<i>Smilax japicanga</i> Griseb (Rodrigues 53)	Japecanga	N	“Doença-do-ar”
Solanaceae	<i>Capsicum frutescens</i> L. (Rodrigues 40)	Pimenta-malagueta	E	“Doença-do-ar”
Verbenaceae	<i>Verbena</i> sp. (Santos 369)	Mutuquinha	–	“Mãe-do-corpo”
Zingiberaceae	<i>Alpinia nutans</i> (L.) Roscoe (Santos 436)	Vidi-caá	E	“Panema”
ANIMALS				
Family	Species (vouchers)	Vernacular names	Native (N) x Exotic (E)	CBS in which it was mentioned in our study
Alligatoridae	<i>Caiman crocodilus</i> Linnaeus, 1758 (Santos 015)	Jacaré-tinga	N	“Derrame” and “doença do ar”
	<i>Melanosuchus niger</i> Spix, 1825	Jacará-açú	N	“Doença-do-ar”
	<i>Paleosuchus trigonatus</i> Schneider, 1801 (Santos 016)	Jacaré-açú	N	“Derrame” and “doença do ar”
Bovidae	<i>Bos</i> sp□	Boi	E	“Mãe-do-corpo”
Felidae	<i>Felis concolor</i> Linnaeus, 1771	Onça Vermelha	N	“Doença-do-ar”
Hylidae	<i>Trachycephalus resinifictrix</i> Goeldi 1907	Sapo-canuaru	N	“Derrame” and “doença do ar”
Tinamidae	<i>Crypturellus parvirostris</i> Wagler, 1827	Nambu	N	“Derrame” and “doença do ar”
Trochilidae	<i>Topaza pella</i> Linnaeus, 1758	Beija-flor	N	“Doença-do-ar”
Tayassuidae	<i>Tayassu tajacu</i> Linnaeus 1758	Cateto	N	“Doença-do-ar”
Cervidae	<i>Mazama americana</i> Erxleben, 1777	Veado	N	“Doença-do-ar”

newborn death. This was not seen in the last visit. Moreover, no case of yellow fever, tetanus, whooping cough or hepatitis was seen or suspected in the last visit, which were frequently recorded during health surveys in the region.

All these changes exposed the almost completely isolated populations to different and strong cultural and medical standards that are also incorporated into their culture. However, due to the physical distance to urban centres and the difficulty to receive official medical care, traditional laymen healing practices remain very strong.

#### 4. Discussion

The purpose of this work was not to deepen the understanding of the anthropological or psychiatric aspects of the CBSs themselves. Our purpose was to provide a hypothetical correlation between the CBSs' clinical manifestations described by the population studied with the terms of conventional medicine to gain insights about the possible

pharmacological activity of the natural resources used for healing, as shown in Table 1.

Treatments for all syndromes reported here included ritual ceremonies, prayers, blessings and sympathetic magic. All these are out of the scope of the present work but might have a true healing effect, similar to that shown for meditation: increasing positive effect and decreasing negative effect, with impact over the nervous and endocrine systems (Hofman et al., 2011). By changing psychological states, these healing practices may induce cognitive and emotional flexibility that promote resilience and wellbeing (Hinton and Kirmayer, 2016). The CBSs are linked to a system of local beliefs. These may take the form of either a culturally recognized and indigenously diagnosed/divined cultural illness or types of behavior recognized by practitioners to reflect particular types of distress in a historical context (Nichter, 2010).

Treatment is based on rituals and sensory perceptions of local healing experts. However, a more rigorous examination process and

treatment used by these traditional practitioners provides important information about the aetiology of these syndromes (Bourbonnais-Spear et al., 2007; Leonti et al., 2001; Quinlan, 2010) and support for pharmacological research with evaluation of the bioactive potential.

Associated with these practices, the interviewees reported the use of 35 natural resources: 25 plants and 10 animals. The plants are distributed in 19 botanical families, with Lamiaceae (four species) and Burseraceae (two species) claiming the most representatives. Still, as seen in Table 2, approximately 50% of the plants are exotic from Brazil. This shows the mixed cultural influence of these people. Moreover, the high percentage of native plants, 50%, reflects the importance of local flora in the attempt to promote the cure of complex diseases, such as the syndromes presented here.

Among the animals, the most representative of the eight families mentioned is the Alligatoridae (four species), due to the use of their “fats” to anoint the patient’s body as a means to improve the absorption of smoke during the smoking process. The animal species in turn are cited only for the treatments of “derrame”, “doença do ar” and “mãe-do-corpo”. According to our findings, poly-formulas predominate, involving more than one plant and/or animal in the same formula. Most formulas are “prescribed” to more than one kind of syndrome.

In many cases observed in this study, psychological manifestations were accompanied by physical manifestations as shown by others (Hinton et al., 2013). Some syndromes described here may be clearly correlated to others already described elsewhere. In our opinion, “mau olhado”, “quebrante” and “espante” are the same as already described elsewhere with some local variations and different names.

As seen in Table 1, it is very difficult to distinguish “mau olhado” and “quebrante”. “Mau olhado” (evil eye), included in DSM IV as ‘mal de ojo’, is one of the oldest and most widespread CBSs of the world. References to it are found in classic Greek texts, in the Bible, in the Islamic literature and in the traditions of Asian ethnic groups and most European, American and African countries (Berger, 2012). It has influenced medicine and social customs around the world (Bohigian, 1997).

“Quebrante” and “quebrante” share an evil look as the cause and have similar manifestations. The main difference is the patient’s age. In the communities studied, both affect only babies and small children, whereas in other locations of Brazil, “quebrante” affects primarily children (Maciel and Guarim Neto, 2006), and “mau olhado” affects adults.

Evil eye’s manifestations in most reports include drowsiness and fatigue. The communities studied also include diarrhea and vomiting. This characterization seems to be common in some locations in Brazil (Maciel and Guarim Neto, 2006) and other indigenous populations of Latin America (Burleigh et al., 1990; Rubel, 1964). Thus, in this specific case, communities may call ‘evil eye’ what the conventional medicine would call acute gastroenteritis due to protozoan, bacteria or virus.

The “espante” syndrome seems to be a Brazilian variation of ‘susto’ included in DSM IV and found in Hispanic America (Table 1). Both words have the same meaning, and both syndromes are caused by a frightening event. There is also some similarity with the ‘fright’ syndrome found in English-speaking Caribbean countries and ‘sésisma’ found in the French Antilles. However, ‘fright’ and ‘sésisma’ are different from susto and espante because both are caused by persistent distress (Quinlan, 2010).

‘Susto’ refers to a syndrome characterized by a cluster of symptoms (Landy, 1985) including sleeping disorders and loss of appetite, weight, strength and motivation. In some cases, symptoms may also include gastrointestinal complaints such as stomach ache, diarrhoea and vomiting. ‘Susto’ is believed by the patients to change the bodily state, leaving the person more vulnerable to several illnesses including cancer (Moon, 1984) and diabetes (Poss and Jezewski, 2002). Studies have shown ‘susto’ to be significantly associated with stress and depressive symptoms (Weller et al., 2008). “Espante” has many of these manifes-

tations but does not seem to be so serious because it has not been associated with such bad outcomes. In both “espante” and ‘susto’, there are mentions of having the soul (or shadow) stolen by animals or supernatural forces (Thomas et al., 2009).

The treatment of these riverine communities for “espante” is a mixture of leaves of *Siparuna guianensis*, *Mansoa alliacea*, and *Leucas martinicensis* (Table 2). These plants are used mainly in baths and skin absorption, leading to a systemic effect that is unlikely to be achieved. Nevertheless, under the hypothesis of this paper, extracts of these plants are suggested to be tested for antidepressant targets (such as reuptake of serotonin, noradrenaline or dopamine) as well as anxiolytic targets (such as GABA receptor). No biological activity has been reported for *M. alliacea* to date. The plant *L. martinicensis* has no CNS activity reported.

According to our observations “doença do ar”, “vento caído”, “derrame” and “mãe do corpo” seem to be folk terms for known conventional medical disorders (Table 1).

The “doenças do ar” are probably not CBSs as conceptualized by DSM VI. These seem to be a Cultural Idiom for a miscellany of disorders prevalent at the Amazonian area such as bacterial diarrhoea, hepatitis, yellow fever, malaria, leprosy and bacterial or fungal infections. According to the detailed report from some respondents, the four main ‘forms’ of “doença do ar” could be translated to conventional medicine as follows: the ‘black’ could be tetanus; the ‘red’ could be measles, and the ‘green’ and the ‘yellow’ could be viral hepatitis. These inferences are derived from the fact that the patient’s skin acquires the color of the disease and other clinical manifestations (Table 1).

For example, the ‘black form’ is characterized by muscular spasms and contortions accompanied by extremities darkening to black or blue. It is considered potentially fatal. Tetanus manifestations are centred on muscular spasms similar to those described for the “black air disease”. Some patients with tetanus may have cyanosis due to decreased ventilation that promotes darkening of extremities. Tetanus can be fatal in newborns and small children. Moreover, according to respondents, the incidence of all air diseases decreased significantly after vaccination campaigns against tetanus, measles and hepatitis.

Table 2 shows that 9 animals and 15 plants are utilized in the treatments of “doença do ar”. The larger resource repertoire used for these cases can be explained by the fact that these diseases have many physical manifestations and caused many deaths in the past, before vaccination. To gain a sense of the complexity of these formulas, we describe a fumigation that was used in the past for the treatment of “doenças do ar”. The following resources (parts) should be placed in a pot with charcoal: ox (horn), deer (horn), porcupine (spine), hummingbird (nest), jaguar (tooth) and the plant *Protium heptaphyllum* (resin). The child should be passed over this smoking by performing 3 cross-movements, 3 times a day, until the child’s symptoms improve.

For the treatment of “doença do ar”, the main plants used are similar to those utilized for “espante”: *S. guianensis*, *M. alliacea*, and *L. martinicensis* along with *Petiveria alliacea* (Table 2). The healers informed that their aim is to “calm down” the patient. This reinforces the suggestion to study these plants for antidepressant or anxiolytic activity. Similar uses for *S. guianensis* were observed among the Yanomami Indians (Milliken and Albert, 1996) and other Amazonian populations (Prance, 1972). Therefore, further studies on CNS activities of *S. guianensis* are suggested. The activities reported to date for *S. guianensis* were insect repellent, cytostatic, signalling for nervous cell development and wound healing (Aguar et al., 2015; Marti et al., 2013; Taylor et al., 2013; Thomé et al., 2012). In our previous studies, we observed that “quilombola” communities (descendants from runaway slaves living in hideouts upcountry) use *Petiveria alliacea* for its mind-altering effects (Rodrigues and Carlini, 2004). Also, some publications provide evidence in favor of *P. alliacea* as a potential source for treatment of anxiety, depression, pain, epilepsy and memory impairments (De Lima et al., 1991; Gomes et al., 2005; Gomes, 2008; Luz et al., 2016).

“Vento caído” has no correspondence to any already described cultural syndrome. References to it are available only in Portuguese (Fraxe, 2004; Viegas, 2007). The description is similar to ours and refers to what conventional medicine would call acute gastroenteritis (Table 1). This seems to be a popular label originating among Brazilian indigenous, rural and riverine communities during or before the last century. It cannot be classified as an idiom of distress and perhaps is not a CBS as conceptualized in psychiatry. According to Table 2, plant resources used are similar to those for “espante” and “doença do ar”, also aimed to “calm down” – *M. alliacea*, *S. guianensis*, *L. martinicensis*, already discussed. *Mentha* sp. and *Cymbopogon citratus* were also mentioned. These last two species are frequently used in Brazil as minor tranquilizers (Rodrigues et al., 2008; Blanco et al., 2009; Costa et al., 2011; Goes et al., 2015).

The “derrame” manifestations include seizures and a wide variety of positive and negative neurological signs and symptoms. No officially recognized neurological or psychiatric disease has all these manifestations, nor does any already described CBS fit this description. ‘Ataque de nervios’ has some similarities but is probably not the same because its clinical manifestations are mainly emotional and behavioural. The ‘ataque de nervios’ description in DSM IV is “an idiom of distress particularly prominent among Latinos from the Caribbean, but recognized among many Latino groups”. Commonly reported symptoms include shouting uncontrollably, attacks of crying, trembling, and becoming verbally or physically aggressive. Dissociative experiences, seizure-like or fainting episodes and suicidal gestures are prominent in some ‘ataques’ but absent from others. A central feature of an ‘ataque de nervios’ is a sense of being out of control (Salmán et al., 1998).

Other mentions to “derrame” with the same meaning, also caused by the wind and including convulsive seizures, have been found in Brazilian communities (Amorozo and Gély, 1988; Costa-Neto, 2000; Moura, 2008). Thus, “derrame” is probably a creation of Brazilian rural communities. We suggest that the ‘emic’ expression “derrame” was taken from conventional medicine for its old meaning of stroke, characterized by a sudden motor deficit, accompanied or not by impairments to the consciousness (Table 1). Later, it was probably extended to any illness displaying neurological deficits, such as Bell’s palsy, and further extended to the central nervous system manifestations of malaria (Singhi, 2011) and yellow fever (Jones and Wilson, 1972) with seizures. In this case, the syndrome described is clearly beyond the concept of culturally determined manifestations of distress. The three plants: *M. alliacea*, *S. guianensis*, *P. alliacea* are also cited for “derrame” (Table 2). Other four vegetable species: *Protium amazonicum*, *Protium aracouchini*, *Protium heptaphyllum*, *Doliocarpus* sp and four animals are also indicated for “derrame”. No biological activities were yet reported for *P. amazonicum*, *P. aracouchini* or *Doliocarpus* sp. The following activities were reported for *P. heptaphyllum*: analgesic (Oliveira et al., 2005), anxiolytic/antidepressant (Aragão et al., 2006), and anti-inflammatory (Oliveira et al., 2004). These plants are suggested to be tested for CNS activity including anxiolytic antidepressant anti-seizure properties.

There are a few mentions of the “mãe do corpo” in other locations of Brazil as part of the beliefs and taboos associated with pregnancy. The meaning was the same: a ‘flesh’ that accompanies the fetus during the pregnancy and starts moving in search of it after birth (Kalinowski et al., 2010; Stefanello et al., 2008). In another study, it was emphasized by the interviewees that the “mãe do corpo” is part of the female’s body (Maués and Villacorta, 2001). In some regions of Brazil, “mãe do corpo” is also a denomination for the uterus (Aragão, 2009).

According to Table 1, we suggest that the cultural syndrome “mãe do corpo” corresponds, at least in part, to the postpartum physiological uterine contractions that are fundamental for normal uterine involution and haemorrhage prevention (Hofmeyr et al., 2008; Olsén et al., 2007). The contractile sensation and pain may also irradiate to the back and chest (Holdcroft et al., 2003). Another possibility is colonic gases,

with pain irradiation. The ‘flesh near the navel’ could be an idea created after looking at the placenta (Table 1). The plants indicated for “mãe do corpo” are *Tanacetum vulgare*, *Aeollanthus suaveolens*, *L. martinicensis*, *Pogostemon cablin*, *Ruta graveolens*, *Selaginella conduplicata*, *Verbena* sp. and one animal, a ox horn (Table 2). One of the most recurrent formulas for this syndrome was tea made with the leaves of *L. martinicensis*, together with wood ashes. We suggest deeper investigations on this plant for antispasmodic activity (Eg. inhibition of muscarinic receptor). The ashes might have some influence, increasing the infusion’s pH. The only mention to this plant in the literature is about its anthelmintic activity (Eguale et al., 2011).

“Panema” is an indigenous Tupi expression meaning pessimism in relation to the results of any activity to be performed (Fleischer, 2007; Galvão, 1951; Wawzyniak, 2012). It is a yet undescribed Brazilian CBS and may be characterized as an affective disorder such as depressive disorder, with several cultural peculiarities that deserve the status of a new CBS (Table 1). The local treatment includes baths with infusions of *Annona montana* and *Alpinia nutans*. Interesting enough, *A. montana* has evidence of activity over the 5HT receptor and therefore possible antidepressant activity (Hasrat et al., 1997), while *A. nutans* has no CNS activity reported and deserves further investigations.

## 5. Conclusion

It was possible to establish hypothetical correlations between CBSs as described by the riverine population studied and some etic terms. The main importance of this is to help the proposition of target-oriented pharmacological studies of the natural resources used by these communities. Accordingly, the following plants are suggested to be submitted to further studies for antidepressant and anxiolytic activities: *Siparuna guianensis*, *Mansoa alliacea*, *Leucas martinicensis*, *Petiveria alliacea*, *Annona montana* and *Alpinia nutans*; for anti-seizure activity: *Protium amazonicum*, *Protium aracouchini* and *Protium heptaphyllum*; finally for antispasmodic activity: *Leucas martinicensis*.

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