Research note

Medicinal plants and people with tuberculosis: description of care practices in Northern Bahia, 2017*

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Abstract

Objective: To describe medicinal plants used by people with tuberculosis (TB) in municipalities in Northern Bahia, in 2017. **Methods:** A descriptive study was carried out with primary data on medicinal plants used by people with TB ≥18 years old, presented according to botanical nomenclature and frequency of consumption. **Results:** Of the 80 people interviewed, 50 reported consuming some kind of medicinal plant; these were mainly male (34), ≥ 47 years old (22), of brown/black skin color (34), with up to complete primary education (25), married (26), not economically active (30), earning up to BRL 300/month (26), with coughs (33) and with no previous history of TB (44). Two species stood out in the citations, *Chenopodium ambrosioides* L. (worm-seed: 23 citations), and *Solanum capsicoides* All. (cockroach berry: 17 citations). **Conclusion**: There was widespread use of medicinal plants as a TB care practice in six municipalities in Northern Bahia.

Keywords: Plants, Medicinal; Tuberculosis; Complementary Therapies; Cross-Sectional Studies.

*Study derived from the Master's Degree dissertation by Walter Ataalpa de Freitas Neto, entitled 'Living conditions and medicinal plant consumption in the therapeutic itinerary of people with tuberculosis in Northern Bahia, 2017', submitted to the Federal University of the São Francisco Valley (UNIVASF) Health and Biological Sciences Postgraduate Program in 2019.

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Introduction

Currently, some 70,000 new tuberculosis (TB) cases are diagnosed in Brazil every year,[1] whereby people with greater social vulnerability are more susceptible to becoming ill.[2,3] TB is a disease requiring long treatment, with different drugs that can cause adverse effects.[4,5]

> *In the quest for well-being and quality of life, medicinal plants have become an alternative, given their therapeutic credibility and low cost. These conditions loom as an invitation for the introduction of alternative therapies in the search for a cure or even to relieve adverse effects of medication.*

There is increasing use of complementary therapies within the Brazilian National Health System (SUS), in particular use of medicinal plants and phytotherapeutic drugs;[6-10] however, no recommendations exist in Brazil regarding these care practices for treating TB. Despite this, in the quest for well-being and quality of life, medicinal plants have become an alternative, given their therapeutic credibility and low cost.[11] These conditions loom as an invitation for the introduction of alternative therapies in the search for a cure or even to relieve adverse effects of medication.

The objective of this study was to describe consumption of medicinal plants used by people diagnosed with TB in municipalities in the north of Bahia state in 2017.

Methods

This is a descriptive study based on household interviews with people diagnosed as having TB (new and retreatment cases), resident in municipalities in the north of the state of Bahia in 2017.

Bahia is comprised of 417 municipalities, distributed over nine Regional Health Areas (RHA), and its estimated population in 2017 was 15,344,447 inhabitants.[11] the Northern Bahia RHA covers 28 municipalities and a population that accounted for approximately 7% of Bahia's population in the year studied.[12-14]

The study population was comprised of all individuals notified as having TB in 2017, resident in municipalities in the northern region of Bahia which had (i) a population >50,000 inhabitants and/or (ii) >10 notified TB cases in 2016. These criteria were adopted to ensure the existence of cases and the feasibility of the study in the territory. The household interviews took place between October 1st and December 30th 2017, by means of a semi-structured questionnaire, which a single interviewer used to ask about the practice of consuming medicinal plants before being diagnosed with TB or after treatment had started. Individuals who had been in treatment for more than two months, those under 18 years old and those with cognitive limitations were excluded from the study.

The open questions were answered freely by the interviewees, and what they said was summarized by the researchers after compiling their answers. The summary of the citations was done based on the answers to the following questions:

"Have you used any medicinal plant before or after starting treatment for TB?"

"Which plant?"

"Why have you used a medicinal plant?"

and

"From whom did you learn to use medicinal plants?"

Data were also collected regarding the person's independent variables during the interview:

a) sex (male; female);

b) age range (in years: 18-36; 37-46; 47 or over);

c) marital status (single; married; other);

d) schooling (up to complete primary school; up to complete middle school; high school education or above);

e) race/skin color (self-reported: brown/black; white/yellow/indigenous);

f) occupation (self-reported: economically active; not economically active);

g) personal income (BRL [R$]/month);

h) alcohol consumption (yes; no);

i) tobacco consumption (yes; no);

j) household status (own; not own);

k) prior history of TB (yes; no);

l) presence of coughing (yes; no);

m) presence of fever (yes; no);

n) sweating (yes; no); and

o) weight loss (yes; no).

The variables were grouped together according to prior knowledge of the scientific literature and their distribution. The data sources were (i) records of the population[12] of the 28 municipalities within the administrative region and (ii) the Notifiable Health Conditions Information System (SINAN),[15] which was consulted in order to confirm notified cases.

The descriptive analyses were performed using the Stata/MP 12.0 computer program, to provide absolute values for plant consumption measurement and to present the species cited. The botanical nomenclature of these species was retrieved from the online version of the Missouri Botanical Garden Tropicos® database.[16]

The study project was approved by the Federal University of the São Francisco Valley Research Ethics Committee (CEP-UNIVASF): Certificate of Submission for Ethical Appraisal (CAAE) No. 67456117.3.0000.5196, dated September 23rd 2017. All participants signed a Free and Informed Consent form.

Results

The Northern Bahia municipalities meeting the study's eligibility criteria were Campo Formoso, Casa Nova, Juazeiro, Paulo Afonso, Pindobaçu and Senhor do Bonfim. In 2017, a total of 199 TB cases were notified on the SINAN system for these municipalities. Of this total number of notified cases, the outcome for 29 (14.6%) was death, 36 (18.0%) had been transferred to other places, 10 (5.0%) had been deprived of liberty and 10 (5.0%) had been lost to follow-up at the time of data collection. In the study period, 114 cases were considered to be feasible for investigation; however 12 people (6.0%) were excluded because they were not found at their residence, 10 (5.0%) because they were under 18 years old, 5 (2.5%) because they had cognitive limitations at the time of the interview and 7 (3.5%) because they refused to take part in the study.

We interviewed 80 people with TB, 50 of whom reported use of medicinal plants as a TB care practice. Higher frequency of medicinal plant use was found among males (34), those aged 47 or over (22), those of brown or black race/skin color (34), those who had up to complete primary education (25), were married (26), were not economically active (30), had income of up to BRL 300/month (26), had a cough (33) and had no prior history of TB (44) (Table 1).

Standing out among the plants were: *Chenopodium ambrosioides* L. (worm-seed), cited by 23 people; and *Solanum capsicoides* All. (cockroach berry), cited by 17 people. Notwithstanding, use of other medical plants was also cited as a TB care practice (Figures 1 and 2). The interviewees reported that medicinal plants relived coughing (13) or helped with expectoration (10), controlling fever and other TB symptoms (7), and their use was also related to controlling adverse effects of medication used to treat TB. Knowledge about use of medicinal plants was mainly attributed to having learned from parents and grandparents (30), and from friends, neighbors and acquaintances (8) (Figure 3).

Table 1 – Characterization of people with tuberculosis regarding socioeconomic and demographic information, lifestyle, symptoms and medicinal plant use in six municipalities in Northern Bahia, 2017

Characteristics of the interviewees	n	Plant use	
		Yes	No
		50	30
Sex			
Male	56	34	22
Female	24	16	8
Age range (in years)			
18-36	21	12	9
37-46	22	16	6
≥47	37	22	15
Race/skin color			
Brown/black	58	34	24
White/yellow/indigenous	22	16	6

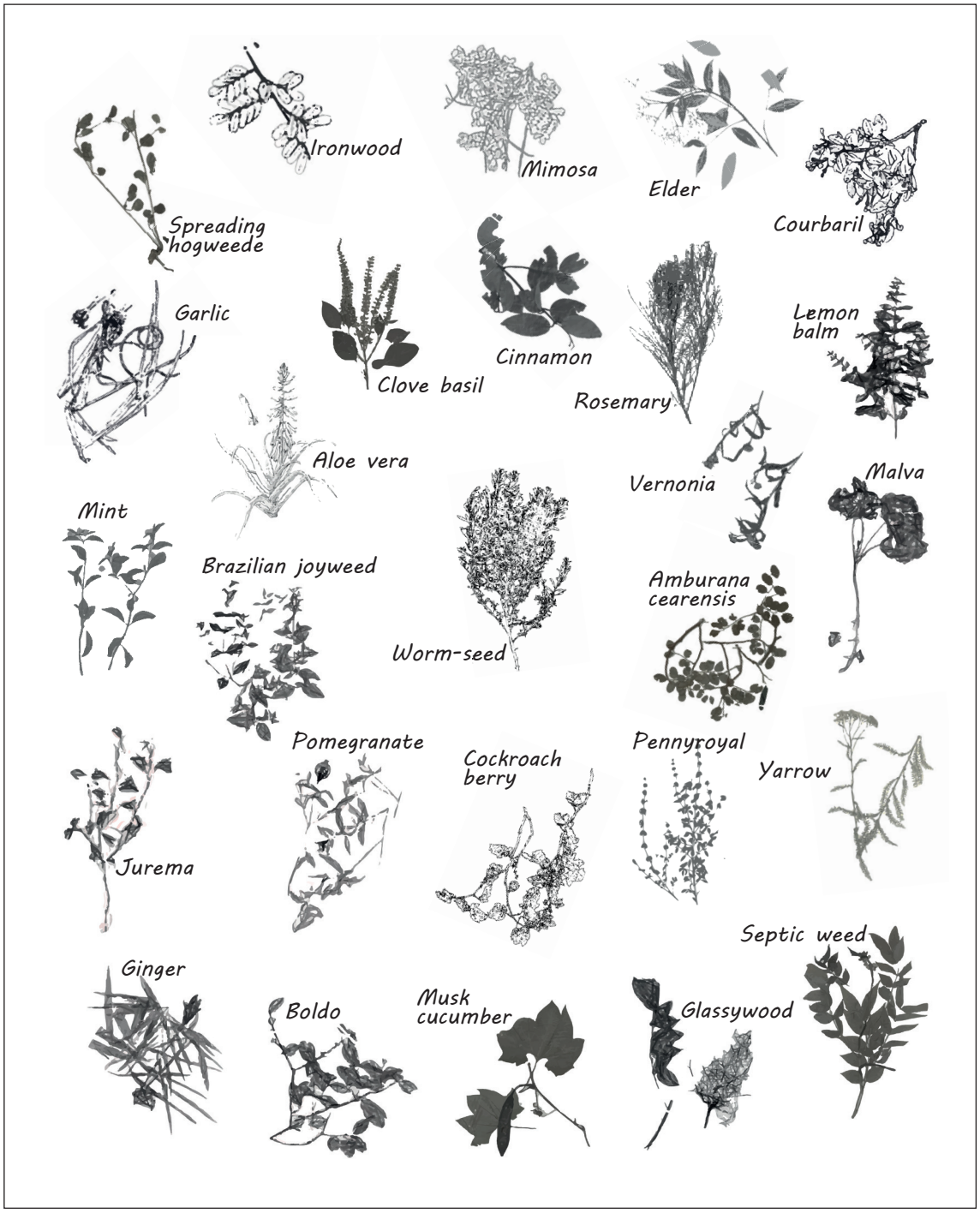
to be continued

continuation

Table 1 – Characterization of people with tuberculosis regarding socioeconomic and demographic information, lifestyle, symptoms and medicinal plant use in six municipalities in Northern Bahia, 2017

Characteristics of the interviewees	n	Plant use	
		Yes	No
		50	30
Schooling			
Up to complete primary education	38	25	13
Up to complete middle school education	28	15	13
High school education or above	14	10	4
Marital status[a]			
Married	39	26	13
Single	28	14	14
Other	13	10	3
Occupation[b]			
Economically active	32	20	12
Not economically active	48	30	18
Personal income (BRL(R$)/month)			
R$ 0,00 a R$ 300,00	40	26	14
R$ 301,00 a R$ 937,00	28	18	10
Maior que R$ 937,00	12	6	6
Household status[c]			
Own home	50	30	20
Not own home	30	20	10
Prior history of tuberculosis			
Yes	12	6	6
No	68	44	24
Alcohol consumption			
Yes	15	11	4
No	65	39	26
Tobacco consumption			
Yes	13	11	2
No	67	39	28
Presence of cough			
Yes	44	33	11
No	36	17	19
Presence of fever			
Yes	21	16	5
No	59	34	25
Sweatin			
Yes	37	23	14
No	43	27	16
Weight loss			
Yes	46	28	18
No	34	22	12

a) Marital status: 'other' category = separated, widowed and other.
b) Occupation: 'economically active' category = employed, retired and social security beneficiary; 'not economically active' category = unemployed and housewife without monthly income.
c) Household status: 'own' category = 1. Owner of the property or 2. Living free of charge in a property belonging to a friend or relative.



Source: Tropicos®. Missouri Botanical Garden.

Figure 1 – Medicinal plants used by people with tuberculosis in six municipalities in Northern Bahia, 2017

Name cited	Botanical nomenclature	Citation n	Indication of use (indicated by the interviewee)
Worm-seed	*Chenopodium ambrosioides* L.	23	Indicated for cough, expectoration, infection, stomach-ache, chest pain and bad colds
Cockroach berry	*Solanum capsicoides* All.	17	Indicated for cough, expectoration and bad colds
Mimosa	*Mimosa* L.	13	Indicated for expectoration, inflammation, cough and bad colds
Ironwood	*Caesalpinia ferrea* Mart.	11	Indicated for expectoration, inflammation, anemia, cough and bad colds
Garlic	*Allium sativum* L.	6	Indicated for expectoration, inflammation, anemia, cough and bad colds
Courbaril	*Hymenaea coubarril* L.	5	Indicated for expectoration, inflammation, anemia, cough and bad colds
Aloe vera	*Aloe succotrina/Aloe vera*	5	Indicated for treating inflammation
Lemon balm	*Melissa officinalis*	5	Indicated for treating stomach-ache
Boldo	*Peumus boldus*	5	Indicated for treating stomach-ache
Common mallow	*Malva sylvestris*	3	Indicated for treating bad colds
Rosemary	*Baccharis* L.	3	Indicated for treating bad colds
Pomegranate	*Punica granatum*	2	IIndicated for treating inflammation
Ginger	*Zingiber officinale*	2	Indicated for treating coughs
Mint	*Mentha*	2	Indicated as expectorant
Licorice	*Glycinopsis* Kuntze	2	Indicated as expectorant
Glassywood	*Astronium graveolens* Jacq.	2	Indicated for treating coughs
Cinnamon	*Cinnamomum zeylanicum*	2	Indicated for treating coughs
Jurema	*Mimosa hostilis*	1	Indicated for treating bad colds
Clove basil	*Ocimum gratissimum* L.	1	Indicated for treating coughs
Vernonia	*Vernonia polysphaera*	1	Indicated for treating coughs
Musk cucumber	*Sicana odorífera*	1	Indicated as expectorant
Septic weed	*Senna occidentalis*	1	Indicated for treating coughs, bad colds and colds
Spreading hogweed	*Boerhavia*	1	Indicated for treating coughs
Pennyroyal	*Mentha pulegiu*	1	Indicated as expectorant
Elder	*Sambucus nigra*	1	Indicated for treating bad colds
Amburana cearensis	*Amburana cearenses*	1	Indicated for treating stomach-ache
Yarrow	*Achillea millefolium* L.	1	Indicated for treating fever
Brazilian joyweed	*Alternanthera brasiliana* (L.) Kuntze	1	Indicated for treating pain

Source: Tropicos®. Missouri Botanical Garden.

Figure 2 – Medicinal plants used by people with tuberculosis, by citation and indication of use, in six municipalities in Northern Bahia, 2017

Discussion

This study found high prevalence of medicinal plant consumption among people with TB, motivated by coughing and other symptoms of the disease. Family influence was found with regard to this knowledge being passed down from generation to generation, as widely discussed in the scientific literature.[17,18] The most cited plant, worm-seed (*Chenopodium ambrosioides* L.), is used in popular medicine for a variety of purposes;[19] its antimicrobial activity against strains of *M. tuberculosis* relieves TB symptoms because it inhibits bacillus growth,[20] and this fact can encourage the incorporation of this species in the care provision for people living with TB. However, under no circumstances whatsoever should it be used to replace treatment proven to lead to cure.[4]

Used in the form of a "lambedor", similar to homemade syrup, cockroach berry (*Solanum capsicoides* All.) was the second most cited plant in the interviews: its use was related to relieving coughing, expectoration and bad colds, although no scientific evidence was found relating it to TB care practice; given the frequency with which its consumption was cited, we suggest that further investigation of this species be conducted.

The people who were interviewed were being treated with medication. The interviews took place at the

Referred use	From whom did you learn to use medicinal plants?	Why did you use a medicinal plant?
Before being diagnosed with tuberculosis (31 citations)	At home, from parents or grandparents (30x)[b]	*"My family says its good, I learned from elders..." (3x)*
		"It helps to cut it out..."
		"It helps my breathing, it's always helped me..." (3x)
		"I improved a lot, it was what helped me before taking the medication" (3x)
		"Because I felt my coughing had improved..." (9x)
		"I felt it stopped the fever..." (2x)
		"I didn't cough and feel short of breath so much"
		"I felt an improvement, I took it to sleep and in the morning I coughed less..."
		"Because people told me to try it..." (2x)
		"It's something our elders do, so I use it, it's good..." (5x)
	According to beliefs and tradition	*"I was advised by my religion"*
After starting treatment of tuberculosisa (9 citations)	From a health center professional	*"I carried on taking it with the medication, but the nurse told me to stop"*
	From friends, neighbors and acquaintances (8x)	*"Because of the effects of the medication..." (5x)*
		It relieved the burning sensation in my stomach..."
		"When I use it my stomach-ache gets better..." (2x)

a) Use of medicinal plants began at some time after treatment started. In this study, all interviewees were in the first stage of treatment – first two months.
b) Number of similar citations grouped together by the researchers.

Figure 3 – Summary of the answers given by people with tuberculosis when asked why and when they used medicinal plants (n=40 answers cited in the three categories), in six municipalities in Northern Bahia, 2017

beginning of treatment in an attempt to minimize recall bias when retrieving information about use of medicinal plants before treatment started. It is also important to highlight the sample size, which was insufficient to analyze associations between use of medicinal plants during treatment and variables of interest. Despite these limitations, besides broadening the discussion on forms of care and care practices, the data obtained provide evidence of use of vegetable species in the TB scenario.

For over 40 years, the World Health Organization has encouraged incorporation of traditional knowledge into Primary Health Care activities.[7] In Brazil, the publication in 2006, of the National Policy on Integrative and Complementary Practices within the SUS, pointed to the need to provide training for health workers in the adequate management of these practices.[6] SUS managers need to collaborate to make this policy effective, through financial incentives and by keeping the subject on the continuing education agenda. Similarly, universities and faculties can consider and discuss the possibility of including this knowledge on Health teaching curricula.[21]

Medicinal plant use was found to be widespread as a TB care practice in Northern Bahia municipalities. In view of this, we recommend that individuals should be questioned and guided on their adequate use and, in the absence of scientific evidence confirming benefits provided by them during TB treatment, that continuing with combination therapy should be advised against.

Authors' contributions

Freitas Neto WA and Maia GLA took part in the study concept and data analysis and interpretation. Andrade SSCA, Silva GDM, Nery JS, Bedor CNG, Sanchez MN, Codenotti SB and Santos MAS contributed to critically reviewing the contents of the manuscript, illustration and translation into other languages. All the authors have approved the final version of the manuscript and declare themselves to be responsible for its accuracy and integrity.

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Erratum

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In the article **"Medicinal plants and people with tuberculosis: description of care practices in Northern Bahia, 2017"** doi: 10.1590/S1679-49742020000500006, published on Epidemiology and Health Services, 29(5):1-9, in the pages 2 and 3:

Original text:

"27 municipalities"

Corrected text:

"28 municipalities"