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Research Paper

This plant treats that illness? The hot–cold system and therapeutic procedures mediate medicinal plant use in San Miguel Tulancingo, Oaxaca, Mexico

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ABSTRACT

Ethnopharmacological relevance: Understanding the reasoning behind the choice of medicinal plants is relevant for both pharmacological and ethnobotanical quantitative studies. In this study, we analyze how the traditional medical system influences the choice of medicinal plants in a Mexican indigenous population.

Materials and methods: The study area was San Miguel Tulancingo, Oaxaca, Mexico, and the studied people the *Rru ngigua* (or Chocholtecs), an Otomangue group with only a few hundred speakers remaining. Through in-depth and repeated interviews of four traditional healers and ethnobotanical collections, we identified, described and classified the medicinal plants, the nosological units, the therapeutic procedures and the reasoning behind medicinal plant and treatment choice.

Results: The hot–cold system, which considers illness to be a result of humoral imbalance, strongly influences treatment choice. "Hot" plants are used mainly to treat "cold" diseases, and vice versa. With some variation, plants are selected mainly for this hot-or-cold property, and the specific plant species is often not very relevant. In addition, many plants are associated with specific healing procedures, such as sweat baths. The procedures, in turn, may be used to treat various diseases.

Conclusions: The study shows that the relationship between medicinal plants and treated diseases is complex and indirect in most cases. It is strongly influenced by the hot–cold concept and by therapeutic procedures.

1. Introduction

Worldwide, Mexico has one of the broadest traditions in the ethnobotanical study of its medicinal flora, rooted in its high biological and cultural diversity. Most studies fall into one of two groups. The first group consists of qualitative documentation of traditional knowledge on the use of medicinal plants in an area obtained through interviews with traditional healers or the general population (Cervantes and Valdés, 1990; Sánchez-González et al., 2008; Magaña et al., 2010). Numerical analyses of these results (for example, to answer the question if there are more species reported for common illnesses) assume a direct relationship between diseases and medicinal plants used to treat them.

A second group of studies with a more quantitative focus tries to elucidate the relative importance of different medicinal plant species of a locality or an ethnic group, often in order to relate the data to various other subjects, such as conservation or pharmacological efficacy. One of the most used methods is informant consensus based on analysis of use categories, particularly those of healers (Frei et al., 1998; Heinrich et al., 1998; Leonti et al., 2001) but also of the general population (Andrade-Cetto, 2009; Juárez-Vázquez et al., 2013). Another method used in quantitative studies is fidelity level, which determines the specificity of a species by calculating the number of informants that report the species for a certain use and the number of informants reporting the plant for any use (Hurtado et al., 2006; Andrade-Cetto, 2009). This type of analysis also postulates that a direct relationship between ailments and medicinal plants exists.

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The hot–cold system in Mesoamerica, a humoral concept first attributed to European influence, but later found to be similar to beliefs in other parts of the world (Messer, 1981; Manderson, 1987, and the special issue it introduces; Feo, 2003; Gonzales et al., 2014) has been studied frequently in Mexico, mainly by anthropologists investigating traditional medicine and health concepts (e.g. Álvarez, 1987). However, in general, these studies lack botanical information.

The study of Giovannini and Heinrich (2009) approaches the influence of the hot–cold concept on the nosology of the *Ha shuta enima* (Mazatecs), and a few ethnobotanical studies refer to the system (Leonti et al., 2001, 2002; Sánchez-González et al., 2008; Vázquez et al., 2011) but they do not analyze the extent to which the concept influences the relationship between treated illnesses and medicinal plant species.

In this paper, we describe the belief system of causes of illness and health of a small ethnic group in northern Oaxaca. To understand the system of traditional medicine among the *Rru ngigua* (Chochos or Chocholtecs), the study included a medicinal plant inventory and extensive interviews with several healers. Through the interviews, we obtained the description, classification and delimitation of recognized illnesses (nosology), their origin (etiology) and treatment. We then examined the relationship between recognized ailments, therapeutic procedures and the selection of medicinal plants. We suggest that the impact of the belief system on specific medicinal plant use has been underestimated. Also, the role of therapeutic procedures has been studied only partially. We show that in the study area the relationship between a medicinal plant and a treated condition is indirect for many recognized ailments.

2. Materials and methods

2.1. The study area

The state of Oaxaca, located in southern Mexico, is the most diverse state of the country in terms of biodiversity and number of indigenous ethnic groups (García-Mendoza et al., 2004). The Mixteca Alta is located in northwestern Oaxaca and is the home of the *Rru ngigua* (Chochos or Chocholtecs), an ethnic group whose language, *Ngiba*, Chocho or Chocholtec of the Otomangue language family, is in danger of extinction. The region is mountainous and dry, with unfertile and easily eroded soils, which limit agriculture to riversides and artificial terraces. The basic crops are rainfed maize, beans and wheat. For decades, migration has been the main alternative to poverty (Barabas, 1996, 1999).

The study area was San Miguel Tulancingo (Fig. 1), the municipal seat, located at an altitude of about 2000 m (INEGI, 2013). It has 346 inhabitants and is one of the few communities with *Rru ngigua* population. Cellphone service, an internet café and a 14 km unpaved road to a federal highway communicate the village with the outside world. Only about one third of the population (32%) is economically active (SEGOB, 2013), 82% of which have an income of up to two minimum wages (about US $300 per month) (CONAPO, 2012). Many inhabitants receive transfer payments from the government (Procampo, Oportunidades) and remittances from migrated relatives. The population has access to free medical service at a rural clinic. The main health problems reported by the clinic are diarrhea, respiratory diseases, dental and periodontal pathologies. Among the elderly population, diabetes and high blood pressure are very common.

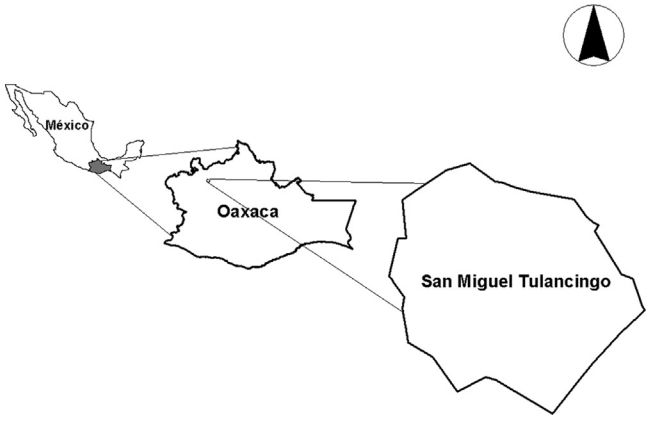

Fig. 1. Location of the municipality San Miguel Tulancingo, Oaxaca.

Despite degraded soil and aridity, several different vegetation types are found in San Miguel Tulancingo: oak forest, spiny bushland (matorral), chaparral, grassland and gallery forest along the Aguadulce creek. These are considered semi-natural in this study as they were exploited intensively in the past. Among the anthropogenic habitats, there are cultivated fields, home gardens, ruderal vegetation, reforested areas (with pines, mainly) and urban, cultivated vegetation (parks, street greenery).

2.2. Field work

The data are based on repeated, extensive interviews with four traditional healers between June 2012 and August 2013. The first author had established contact with them and made a preliminary list of the local medicinal plants in previous work. Informed consent was obtained from both the municipal authorities in writing and the interviewed specialists orally.

The interviewed healers in Tulancingo were two men, who were "*curanderos*" (general healers, mostly consulted for culture-bound syndromes; sources 3 and 4 in Appendix A) and two women, one of whom was a bone-setter (*huesera*, source 1) and the other a midwife (*partera*, source 2). All healers were elderly, had learned their trade independently in various ways but mostly from relatives, and had spent time outside of the village. None of them had apprentices.

For plants, the following data were registered: common names (in Spanish and *Ngiba*), the ailments for which they were used that were specifically mentioned (even if they could be substituted by others), manner of use, part used, property (cold/hot), preparation and treatment procedure. Most plants were collected together with the informants or other knowledgeable persons (collection permits SPA/DGVS/01848/12 and SGPA/DGGFS/712/2872/12) and then shown to the informants; a few could not be collected for various reasons but were identified in the field or with photos. The collections were identified with conventional methods, and voucher specimens were deposited at CHAPA (Herbario-Hortorio, Colegio de Postgraduados, Texcoco, Mexico). Nomenclature was standardized with the Tropicos database and in some cases with the Flora Mesoamericana.

For each recognized nosological unit (called disease, ailment, condition or illness in this paper), the data documented were common name(s), property (cold/hot), causes, symptoms and the therapeutic procedure used. Some nosological units were preventive rather than curative; in this text the term "use objective" was applied to these (e.g. "strengthening of the liver", treatments after giving birth). Procedures were the techniques in which the plants were used (e.g. the temazcal sweat bath).

Both therapeutic procedures and the hot/cold system were additional subjects of the interviews. Some of the procedures were observed directly.

2.3. Data and their analysis

Ngiba names of the plants were transcribed using two sets of data. For the first set, we specifically interviewed the healer most fluent in the language with a digital recorder in order to obtain the