

A Pilot Study of Herbal Medicine Use in a Midwest Latino Population

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ABSTRACT

Background: Herbal medicine use is common in the United States, especially in immigrant populations. Understanding of this plant use is incomplete, with significant gaps in the literature for people living in the Midwest, about the plant species used, and about how home herbal medicine use interacts with allopathic medicine.

Methods: This pilot project used a qualitative research approach (interviews and focus groups, convenience sampling) to explore this topic for Latin America immigrants living in Madison, Wisconsin.

Results: Eight interviews and focus groups consisting of 42 people yielded 199 minutes of audio recordings and the mention of 57 medicinal plants. These plants were obtained from gardens, relatives and friends (abroad and local), mail order, and local retail establishments. Retail sites sold fresh plants, dried plants, spices, foods, and packaged products, ranging from 20 to over 150 plant products per site. A preponderance of plants, especially in Latino-focused stores, was food that also served a medicinal purpose. Participants mentioned 35 distinct health and disease categories for which herbal medicines were used, and sometimes, but not always, discussed plant use with their health care provider. When compared with likely Latin binomial taxonomic names, clinically relevant confusions with the use of common plant names also were identified.

Discussion: Overall, the findings presented illustrate the complexities surrounding herbal medicine use and create a case for future work to involve other demographics, and focus on botanical identification, the quantification of disclosure rates, and the development of educational interventions for physicians and patients.

INTRODUCTION

Herbal medicine, variously defined as “herbs,” “plant medicines,” or “botanical medicines”¹ is a common treatment throughout the world. It is estimated that 80% of people rely on traditional medicine, which is mostly herbal medicine, to meet their primary health care needs.^{2,3} In the United States, the use of complementary and alternative medicine (CAM), one component of which is

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herbal medicine, is common. For example, recent estimates are that approximately 20% of the US population regularly uses herbal medicine.^{4,5} The prevalence of herbal medicine use by some ethnic and cultural groups in the US may be even higher; one meta-analysis found that 4% to 100% (mean 30%) of Latinos living in the United States regularly used herbal medicine.⁶ A possible explanation for the wide prevalence range in that meta-analysis is a diversity of research methodologies, including geographic location, study size, and demographics of study participants.

In addition to the challenges of interpreting the pooled Hispanic herbal use data as mentioned above, the published literature has omissions that compromise the applicability and relevance of the research for clinicians, patients, and researchers. For example, Latino herbal medicine use in the Midwest is a relative unknown; of the articles in 2 recent reviews,^{6,7} only 4 originated from the Midwest (3 in Illinois, 1 in Ohio). In addition, although several nationwide surveys have yielded data about the use of herbal medicines by Latinos that may be relevant to the Midwest, the authors of one of these reviews found significant regional variation in prevalence data and difficulties in extrapolating between regions;⁶ their recommendation was for more regional surveys in order to more accurately understand this topic. Furthermore, herbal surveys may or may not address the source of plants, relevant to safety concerns given some recent reports of herbal adulterations from suspect sources; the source of herbal knowledge; or a complete list of plants being used in a given community. With respect to the latter, commonly only a subset of herbal remedies is reported by researchers (for example, “most common herbal remedies”⁸), though a complete list may be the most informative for clinicians and patients.

Table 1. Focus Group Questions in English and Spanish

Questions in English	Questions in Spanish
Which plants, herbs, etc do you use for medicinal purposes?	¿Usan Uds cuales plantas (hierbas, etc) para curarse?
For which medical problems?	¿Para cuales enfermedades?
How often?	¿Las usan a menudo, raramente, de vez en cuando...?
Who taught you? (no names, just “friend,” “mother,” “herbalist,” etc)	¿Quién les enseñó a Uds. como usar las plantas? (sin nombres, sólo “amigo,” “madre,” “curandero,” etc”
Where do you obtain the plants?	¿Dónde las consiguen?
Do you tell your physician about this use?	¿Si las usan, le informan a su médico que las están usando?

This study was designed to begin the process of addressing some of the shortcomings mentioned above in the Latino herbal medicine literature by studying 1 Midwestern community (Madison, Wisconsin). The primary aims were: (1) to compile a comprehensive list of plants used for medicines (common names), (2) determine the diagnoses for which plants were being used, and (3) document the sources of plants (including retail sites) and plant knowledge. As a pilot study, the data collected is part of a larger research project meant to improve on the communication about and the safe and effective use of traditional herbal medicines in the context of the allopathic medical system.

METHODS

This was a qualitative research project, utilizing individual interviews and focus groups, as well as a visual survey of herbal medicine retail outlets in Madison, Wis. Madison has an estimated population of 239,901, with 6.8% of the population self-designated as Hispanic or Latino, most commonly from Mexico or Puerto Rico.⁹ There are several Latino-focused community organizations which, combined with knowledge of the Latino community by 2 of the authors (PTG, DK), were used initially to identify study participants for the interviews and focus groups.

Individual interviews and multi-person focus groups

Individual interviews and focus groups were held between August, 2012, and February, 2013. Inclusion criteria for participation in this research project were any adult (age 18 and older) Latino community members interested in or using (past or present) herbal medicine for personal or professional purposes. Gender, race, health concern, or treatment status were not considered when selecting participants for this study. A convenience sampling of individuals with interest and experience in herbal medicine was used to locate initial study participants; this approach was in line with other herbal medicine use surveys. As mentioned above, the initial identification of research participants occurred through Latino community organizations and Latino community members. Additional participants were identified through “snowballing,” a reference to the query of participants if they might be able to suggest other potential research participants.

Interviews and focus groups were conducted in Spanish by one

of the authors (DK) who is fluent in both Spanish and English. An attempt was made to schedule numerous people for a few set focus group times, though sometimes only 1 person would attend the session (a de facto individual interview) or a study participant requested a time and place that suited their availability but no one else’s. The introduction to both the interviews and focus groups included a statement of the project’s purpose, which was to explore the use of any and all plants for healing, and that the discussion would focus on the individual’s own herbal medicine use. In addition, it was requested that neither sensitive personal information nor any secret “family recipes” relevant to herbal medicine preparation be shared. These safeguards were put in place to protect the individuals and their intellectual property. Furthermore, if the conversation veered onto the topic of plants used while living abroad (by the participant or their families), the discussion was redirected to a US focus; plants used while living in other countries or knowledge about plants used abroad were not included in the summaries for this project. A list of the questions and topics for the focus groups in English and Spanish is provided in Table 1.

With permission, audio recordings were made of the focus groups, although in 1 case, due to the large group size and deemed difficulty in transcribing the recording, only written notes were taken. None of the individual interviews were recorded. In accordance with the University of Wisconsin Institutional Review Board exemption granted this project, participants remained anonymous and an extensive series of steps were taken to maintain strict confidentiality and human subjects protection. The audio recordings were heard only by the lead researcher (DK) and a professional transcription service used previously by the University of Wisconsin Department of Family Medicine. After transcription, the audio recordings were destroyed, and were not used for any presentations or professional meetings.

Focus groups and interviews continued to be scheduled until it became clear to the lead researcher (DK) that saturation was reached. Saturation of the data collected for this project was apparent by failure of subsequent meetings to yield new plant species, new retail outlets, novel herbal medicine uses, or a unique approach to learning about herbal medicines.

Transcriptions and written notes were reviewed to identify

Table 2. Summary of 3 Aspects of Herbal Medicine Use From 8 Focus Groups in Madison, Wisconsin

Number of Attendees	Number of Plants Mentioned	Source(s) of Plants	Source(s) of Information
4	11	Grocery stores, sent from abroad, pharmacies, mail order from US companies, <i>tiendas</i>	Internet; family
1	6	Sent from abroad, plant nurseries, grocery stores	Herbalist abroad
4	19	Sent from abroad, mail order from US companies, natural areas	Family, television
1	4	Pharmacies	General knowledge from home country
1	4	Home gardens; mail order from US companies	General knowledge
5	14	Gardens	General knowledge, HCPs, family,
3	25	Sent from abroad, grocery stores, <i>tiendas</i>	Herbalists, internet, books
23	27	Grocery stores, <i>tiendas</i> , home gardens	Family, reading, friends

any plant used by study participants while living in the United States and mentioned as having medicinal use. Herbal medicine and medical literature¹⁰⁻¹⁴ were used to find a likely English common name and a Latin binomial name for some of the highly mentioned plants and their Spanish common names. When there was ambiguity in the literature about the identification of a plant based on its Spanish common name, alternative possible Latin binomial names were noted. Transcriptions and written notes also were reviewed for sources of herbal medicine information and plant material, as well as health conditions for which the plants were used. The latter information included any symptom, health condition, or mechanism of action. When the herbal medicine use was vague, an attempt was made during the focus groups to clarify the use to a more specific symptom or medical condition. Any mention of a health care provider (HCP) in the transcripts or written notes was explored for themes about disclosure of herbal medicine use, including how that decision was made, as well as when disclosure did or did not happen.

Survey of retail outlets

During preliminary community discussions in preparation for this project, the researchers realized that retail outlets served an important purpose with respect to procuring medicinal plants for personal consumption. For this reason, retail sites that stocked plants of medicinal importance to the Latino community were surveyed. Such outlets were located through several methods: mention by community members or study participants, local clinicians' knowledge about the Madison area, and internet searches using the terms "Madison, Wisconsin," "herbal medicines," "Latino," "Hispanic," or any combination thereof. These sites were visited in person between July, 2012, and January, 2013. Each site was visited by at least 1 member of the research team. The researcher(s) introduced themselves to the store owner(s) or employee(s), distributed business cards and a description of the project in English and Spanish, and asked for permission to inspect any plant products as well as take pictures or revisit the site should future questions surface. Retail products were inventoried based on their potential uses as medicines, including foods with medicinal uses in the Latino community, dietary supplements, and topical treatments. The "food as medicine" products

included any ingested fresh or dried spices, herbs, fruits or vegetables used for cooking or food consumption. "Dietary supplements" included both non-culinary herbs that are ingested whole, powdered, or as teas, tablets, or capsules, and purified compounds used as supplements. "Topical treatments" consist of any product that is applied to the skin. The total number of products in each of the categories for each of the retail sites was recorded.

RESULTS

Three individual interviews and 5 focus groups were held, comprising a total of 42 study participants and 199 minutes of audio recordings. Table 2 summarizes the total plant species mentioned during each meeting; depending on the meeting, 4 to 27 plants were listed by study participants. These plants were procured most often from grocery stores, mail order from US companies, pharmacies, home gardens, and specialized grocery stores selling Latin American foods and other products (*tiendas*). Family members were the most common source of information for study participants.

A compilation of plants mentioned by study participants is presented in Table 3. Only the Spanish common plant name is listed, the direct form of the information from focus group and interview transcriptions and written notes. Fifty-seven different plants were mentioned in the 8 meetings. As is evident in the table, some plants, such as *manzanilla* or *hierba buena* were mentioned in most, if not all, meetings. Other plants, such as *arnica*, *maca* or *uña de gato* were discussed in only 1 meeting.

Study participants mentioned many symptoms and health conditions for which they used herbal medicine, which is detailed in Table 4 for those symptoms or conditions with more than 1 plant treatment. The symptoms or conditions for which the most herbal medicines were used were diabetes, gastritis, hyperlipidemia, hypertension, indigestion, pain, stomachache, and upper respiratory tract infections. Medicinal plants mentioned but only used abroad were excluded from Table 4, as were plants mentioned as being "medicinal," but without specified use(s) (*borraja*, *malva*, *estafiate*, *hierba mora*, *jamaica*, and *té verde*). For the symptoms or conditions mentioned in Table 4, plants were used in some cases for both prevention and treatment, the distinction of

which is not made in the presentation of the data. Also excluded from Table 4 were the few medical conditions with only 1 herbal treatment. These were usually mentioned by just 1 study participant and included alphabetically by Spanish common names (English) *alpiste* (canary seed) for obesity, *calendula* (calendula) for bruises, *jengibre* (ginger) for depression, *linaza* (flax) to “*limpiar el sangre*” (clean the blood), *llantén* (plantain) for fractures, *manzanilla* (chamomile) to foster childbirth, *orégano* (oregano) for menstrual cramps, *ruda* (rue) for lice, *sábila* (aloe vera) for good luck, *sábila* (aloe vera) for hair loss, *uña de gato* (cat’s claw) for cancer, and *yuca* (cassava) for alcoholism.

The results of extrapolation from Spanish common names to likely English common name(s) and Latin binomial name(s) is found in Table 5. This analysis was done for only a few of the plants, those with concrete botanical taxonomic information in the literature, in order to illustrate a range of the published data that exists for herbal medicine nomenclature. For some plants (ie, garlic, ginger, green tea), there is only 1 species corresponding to a given common name, negating the chance for obfuscation. In other cases, a Spanish common name could refer to 1 of several different plants (*árnica*, *canela*, *estafiate*), or there might be 2 Spanish common names for 1 plant (*paico* and *epazote* both likely refer to *Dysphania ambrosioides*). The possible clinical significance of this is discussed below.

The disclosure of herbal medicine use by study participants to their HCPs was complex. Rather than a simple “yes” or “no,” participants discussed some treatments with their HCP, but then decided to withhold disclosure about other herbal therapies, at times due to the HCP’s lack of knowledge or respect about the topic in an earlier encounter. In addition, participants of 1 focus group mentioned that disclosure depends on the perceived medical condition; colds and flus, for instance, were treated at home with herbal medicines, primarily because the allopathic options available were deemed ineffective.

The retail outlet survey of the city of Madison located 10 establishments with herbal medicine products or raw materials for sale (designated at A-J in Figure 1). This number included grocery stores mentioned by study participants as having foods that they purchased and used as medicines. An example of one such food mentioned is *nopal* (prickly pear cactus, *Opuntia* spp), a typical food in Latino culture, but also a plant that serves to lower serum glucose¹⁵ (Figure 2). Eight of the retail outlets (A-H) clearly had a Latino focus with most or all signage in Spanish, and were referred to by study participants as *tiendas*. Two retail outlets (I and J in Figure 1) could be considered as specialty herbal medicine stores, with a significant portion of their space dedicated to herbal medicines and dietary supplements. The product offering of these 2 stores included hundreds of products, but, for the purpose of comparison with the other retail outlets, was arbitrarily designated as 150 in Figure 1. These 2 sites were mentioned by

Table 3. Medicinal Plants Mentioned by Study Participants as Compiled From Focus Group and Interview Results

Plant Spanish name	Focus Group or Interview Number							
	1	2	3	4	5	6	7	8
Ajo	X					X	X	X
Albahaca								X
Alpiste			X					X
Anís							X	X
Apio			X				X	X
Árnica					X			
Avena			X				X	
Berenjena							X	
Borraja				X				
Calendula								X
Canela	X		X					
Cebolla			X					X
Chia								
Clavo			X				X	X
Cola de caballo						X	X	
Echinacea			X					
Elote						X		X
Epazote			X					
Espino blanco	X							
Estafiate	X							
Eucaliptus		X		X			X	X
Flor de azahár						X		
Gordolobo	X		X					
Guisazo de caballo						X		
Hierba buena	X	X	X		X	X	X	X
Hierba de perro								X
Hierba de sapo	X	X						
Hierba luisa						X	X	
Hierba mora								X
Hoja de la suerte						X		
Jamaica								X
Jengibre								X
Jugo menonita	X							
Laurel								
Limón		X	X					
Linaza							X	X
Llantén							X	X
Maca							X	
Malva				X				
Manzanilla	X	X	X	X	X	X	X	X
Mastuerzo							X	
Menta	X		X			X		
Nopal		X	X		X			
Orégano	X					X	X	X
Paico								X
Papa							X	
Papaya								X
Pepino								X
Piña			X					
Remolacha							X	
Ruda			X					X
Sábila			X			X	X	X
Té verde							X	
Tilo						X		
Uña de gato								X
Uva			X					
Yuca							X	

The 57 medicinal plants mentioned by study participants are listed in alphabetical order by common name. (“X” indicates a mention of that plant in a given focus group).

Table 4. Herbal Medicine Used for Symptoms or Health Problems, as Reported by Focus Group Participants

Use (Alphabetical by Symptom or Health Problem)	Common Spanish Plant Names (and English, if Easily Identifiable)
Anxiety (for “nerves”)	tilo (linden), valeriana (valerian)
Cardiovascular disease prevention (for “circulation,” for “heart”)	ajo (garlic), apio (celery), espino blanco
Colic (childhood)	anís (anise seed), manzanilla (chamomile), orégano (oregano)
Cough	ajo (garlic), cebolla (onion), echinacea (echinacea), eucalipto (eucalyptus), hierba buena (peppermint)
Dermatitis (including “skin problems” and sunburn)	llantén (plantain), mastuerzo, sábila (aloe vera)
Diabetes	albahaca (basil), alpiste, apio (celery), berenjena (eggplant), hierba del sapo, jugo meninito, nopal (prickly pear)
Earache	ajo (garlic), ruda (rue)
Edema and swelling	llantén (plantain)
Gastritis (including <i>H pylori</i> and “ulcers”)	ajo (garlic), hierba buena (peppermint), jengibre (ginger), limón (lemon or lime), menta (spearmint), nopal (prickly pear cactus), sábila (aloe vera)
Headache (including migraine)	hierba buena (peppermint), papa (potato)
Heartburn	hierba buena (peppermint), menta (spearmint)
Hepatitis	hierba del sapo, sábila (aloe vera)
High blood pressure (including hypertension, and a diuretic action)	ajo (garlic), alpiste, apio (celery), espino blanco, hierba del sapo, pepino (cucumber), remolacha (beets), sábila (aloe vera)
High cholesterol	alpiste, berenjena (eggplant), chia (chia), hierba del sapo, linaza (flax)
Indigestion (or to help with digestion, including gas)	anís (anise seed), hierba buena (peppermint), jengibre (ginger), manzanilla (chamomile), boldo, menta (spearmint), nopal (prickly pear), orégano (oregano), papaya (papaya), sábila (aloe vera)
Insomnia	manzanilla (chamomile), menta (spearmint), orégano (oregano)
Kidney stones	cola de caballo (horsetail), pelo de elote (corn silk), sábila (aloe vera)
Pain (including joint pain, rheumatism)	ajo (garlic), camphor (camphor), llantén (plantain), maca, ruda (rue), uva (grapeseed oil)
Sore throat	eucalipto (eucalyptus), limón (lemon juice), miel de abeja (honey)
Stomachache	anís (anise seed), epazote (wormseed), gordolobo (mullein), hierba buena (peppermint), hierba del perro, manzanilla (chamomile), orégano (oregano), paico (wormseed)
Toothache	calendula (calendula), canela (cinnamon), clavo (clove)
Upper respiratory tract infections (including sinusitis, colds, flu, bronchitis, phlegm)	ajo (garlic), canela (cinnamon), eucalipto (eucalyptus), ganoderma (reishi), laurel (laurel), orégano (oregano), sábila (aloe vera)
Wounds	arnica (arnica), calendula (calendula), cebolla (onion)

Table 5. Selected Herbal Medicines Mentioned by Study Participants

Spanish Name	English Name	Latin Binomial Name for Likely Plant	Alternative Plants (as Latin Binomial Names) for a Given Spanish Name
Ajo	Garlic	<i>Allium sativum</i>	N/A
Árnica	Arnica	<i>Arnica montana</i>	<i>A fulgens</i> , <i>A chamissonis</i>
Canela	Cinnamon	<i>Cinnamomum cassia</i>	<i>Cinnamomum verum</i>
Echinacea	Purple coneflower	<i>Echinacea purpurea</i>	<i>E angustifolia</i> , <i>E pallida</i>
Epazote	Wormseed, wormwood	<i>Dysphania ambrosioides</i>	<i>Chenopodium ambrosioides</i>
Estafiate	Wormwood	<i>Artemesia spp</i>	<i>A absinthium</i> , <i>A annua</i> , <i>A maritima</i> , <i>A pontica</i>
Jengibre	Ginger	<i>Zingiber officinale</i>	N/A
Hierba buena	Peppermint	<i>Mentha x piperita</i>	<i>Mentha spicata</i>
Manzanilla	Chamomile	<i>Matricaria recutita</i>	<i>Chamaemelum nobile</i>
Menta	Spearmint	<i>Mentha spicata</i>	<i>Mentha x piperita</i>
Paico	Wormwood	<i>Dysphania ambrosioides</i>	<i>Chenopodium ambrosioides</i>
Sábila	Aloe	<i>Aloe vera</i>	<i>Aloe barbadensis</i> (synonym)
Té verde	Green tea	<i>Camellia sinensis</i>	N/A
Uña de gato	Cat’s claw	<i>Uncaria tomentosa</i>	<i>U guianensis</i>

Herbal medicines listed alphabetically by Spanish common names, with corresponding likely English and Latin binomial names. The last column lists alternative plant species (listed by Latin binomial names) corresponding to a given Spanish common name.

study participants, but did not appear to have a Latino focus; rather, they are important sources of herbal medicines for the Madison community as a whole and offer little, if any, literature or advertising in Spanish. Another clarification necessary is about retail outlet “E.” This was a nationwide pharmacy with 1 branch in Madison that stocked herbal products clearly marketed toward Latinos; these products were located in a separate section and were labeled in Spanish. For “E”, the herbal products in the separate section were the products counted and included in Figure 1, not the multitude of dietary supplements, nor the herbal lotions, creams, or shampoos that are also found in such large, conventional pharmacies.

In addition to a range in number of herbal products offered for sale, Figure 1 shows that each retail outlet sells a unique proportion of topical treatments, herbal supplements, and food-as-medicine plants. For the Latino-focused sites (A-H), an average of 4.7% of products sold were topical treatments, 43.1% were herbal medicines, and 52.1% were food-as-medicine plants (Figure 3).

DISCUSSION

A complete description of the factors involved in herbal medicine use is complex, as evidenced by some of the findings of this pilot research study. With respect to the diversity of plants being used for medicinal properties, Latinos in Madison mentioned 57 plants as being useful for 35 distinct health conditions. Some of those plants are foods, some are spices, and some are plants used only for their specialized healing properties. It was beyond the scope of this pilot project to identify the plants to their established Latin scientific name, but that is an important next step in eliminating the confusion that exists, and which was illustrated in the results present here, in communication about herbal medicine that is based solely on common names.¹⁶ Few studies have used dried plant specimens deposited in an herbarium to definitively identify plants from their common name;^{17,18} this could be a model for future research efforts on this topic. Nonetheless, the large number of plants mentioned by study participants in this project is an important addition to the literature; most other Latino herbal surveys provide detail on only 10 to 20 plants.^{6,7}

Comparison to Other Studies

Expanding on the 4 prior Midwestern Latino herbal surveys,¹⁹⁻²² this study provides information about Wisconsin, offers information about more plants, and takes a broader view of herbal medicine use in a given community. As a comparison, one of the prior Midwestern studies interviewed 26 customers of an herbal store in Chicago, documenting the use of 12 medicinal plants, some of which overlapped with the results from this project.¹⁹ Two of the other herbal use studies were surveys of women living in Chicago, 30 in “midlife,”²⁰ and 56 who were peri- or post-menopausal.²¹ Again, these 2 studies documented plants similar

Figure 1. Number and Category of Herbal Products Sold for Latino Herbal Medicine Retail Outlets in Madison

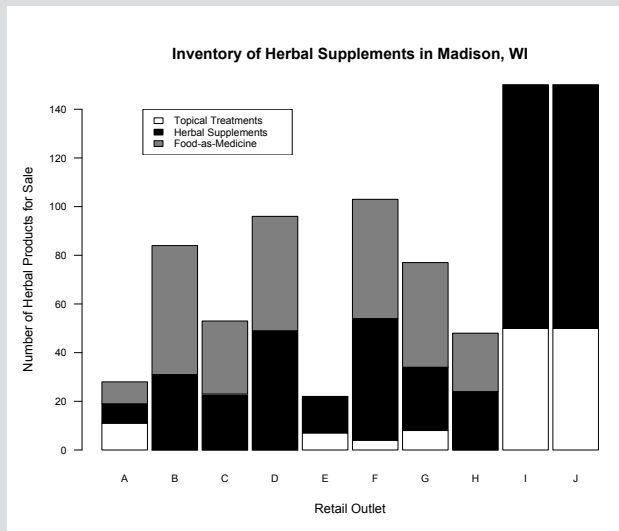
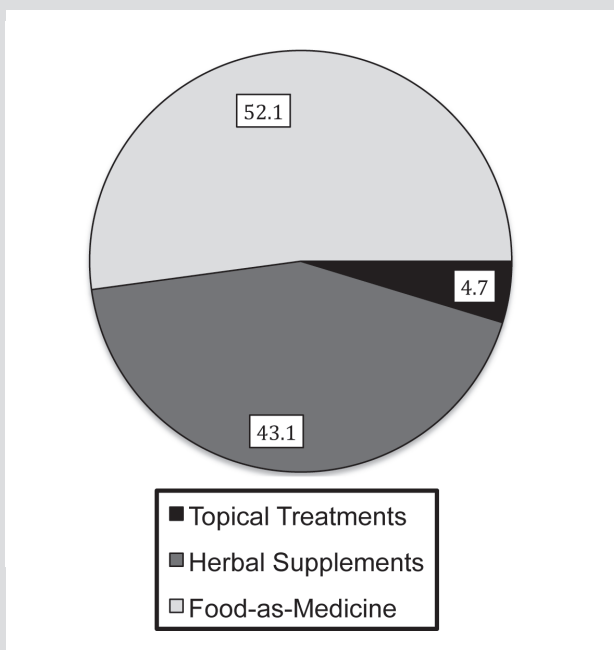


Figure 2: Prickly Pear Cactus



Prickly pear cactus pads, called nopal in Spanish, are from the genus *Opuntia* spp. This typical food in Latino culture is used to treat diabetes; some studies do show that it helps to lower serum glucose. (Photo credit: David Kiefer)

Figure 3. Average Percentage of Products in the 3 Herbal Medicine Categories for 8 Latino-focused Stores (*tiendas*) in Madison, Wisconsin



to those in the current study, while the latter also found a reliance on herbal information from friends and family, in agreement with these Madison results. Finally, an Ohio study in 20 people with diabetes found that 8 were using herbal medicines.²² That diagnosis-specific survey was a different approach than this study's attempt to more broadly survey a community about herbal use. Some experts posit that a local focus on herbal medicine use research has scientific merit.⁶ Their assertion is that such research, rather than large, national surveys, provides a more accurate view of herbal medicine use, with more specifics about sourcing and preparation, and provides "qualitative insight into herb use trends." As much as this Madison project accomplishes that goal, the small, pilot nature of this study and some of the study limitations detailed below prohibit drawing concrete conclusions or comparisons between other regions or survey results.

Herbal Medicine Sources

With respect to herbal medicine sourcing, the results of this community survey found that, in addition to gardens, sources abroad, and mail order, retail sites are one of the places where Latinos obtain herbal medicines in Madison. Several types of retail outlets exist, offering a variety of herbal products, and dozens of plant products are available for sale, demonstrating a robust herbal medicine culture in Madison. It was outside the scope of this project to do a comprehensive survey of home or community gardening, though these were mentioned by study participants as important sources of herbal medicines, especially

during the summer months. A collaboration with community gardens to explore this aspect of plant use would be a valuable offshoot of these research results.

Plant Identification

Another finding is that the reliance on common plant names causes the possibility of confusion in the use of some herbal medicines. Without collection of plants in an adequate form for taxonomic identification in an herbarium, it is difficult to know definitively that *epazote*, for instance, is a specific species of *Artemisia*; the several species of *Artemisia* listed in Table 4 have unique physiological effects that could have clinical significance.¹¹ Another example is cinnamon, or canela, commonly used for diabetes. It could be 1 of 2 species, though the most studied and likely to have hypoglycemic effects is Cassia cinnamon (*Cinamomum cassia*).²³ Although there is conflicting research about Cassia cinnamon's effects, some studies show additive effects with a patient's hypoglycemic pharmaceuticals; a HCP would want to know which and how much of a particular cinnamon product their patient with diabetes might be taking and provide appropriate counseling. Several other plants listed in Table 4 could have this clinically relevant confusion, making a case for a Latin binomial focus of HCP plant discussions and product labeling. Along these lines, future projects should attempt to identify, through herbarium specimens if possible, the plants listed in Table 3.

Food as Medicine

A final element of this study that carries significant clinical relevance is the prevalence of "medicinal" food plants. Though this was not one of the original primary aims of this study, the preponderance of medicinal plants that are also foods or spices further supports the importance of dietary discussions between clinicians and patients. Given that over half of the plants sold by Latino *tiendas* in Madison are food plants (Figure 3) and the physiological significance of many foods and spices (as referenced above), this study underscores the clinical relevance of food-as-medicine discussions with Latino patients.

Study Limitations

There are several limitations to this study that limit the generalizability and internal validity of the results, much of which is due to the fact that this is a small pilot research study using a convenience sampling methodology. One avenue of future exploration that would allow calculation of prevalence of herbal medicine use and more definitive comparison with other surveys would be an expansion of data collection through community-wide surveys. Another limitation is that this study relied on self-reported herbal use, leading to data unreliability. For example, although the physician conducting the interviews and focus groups was not the personal physician of any of the study participants, an

inherent distrust of allopathic HCPs for a variety of reasons, a reluctance to share personal information about herbal use, or simply forgetting some of the plants used recently could have affected the data collected. The selection bias of herbal users to be interviewed further limits the generalizability of these results; again, an argument for follow-up surveys to accurately determine herbal use prevalence and expand on the project's other data.

Nondisclosure

Some of the study participants mentioned when they do or do not disclose their herbal medicine use to their HCP. The limitations of the study methodology prohibit drawing firm conclusions from these reports, but lack of disclosure is concordant with some important published work that documents significant nondisclosure rates of herbal use to primary care providers.^{24,25} Future research efforts to further understand this nondisclosure may lead to safer herbal use; if patients and HCPs communicate about herbal medicines, perhaps adverse plant-pharmaceutical interactions or the use of unsafe plants or dosages can be avoided.

Summary

Overall, the results of this pilot study, even with its methodological limitations, illustrate an extensive culture of herbal medicine use amongst Latinos in Madison. This culture involves a broad network of information and plant sources, and plants that include foods and spices. Several extensions of this data for future research projects are suggested to provide the herbal medicine detail necessary to further advance clinical applicability.

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