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Review

Intercultural health and ethnobotany: How to improve healthcare for underserved and minority communities? ☆



Ina Vandebroek*

Institute of Economic Botany, The New York Botanical Garden, 2900 Southern Boulevard, Bronx, NY 10458, USA

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ABSTRACT

Ethnopharmacological relevance: The present conceptual review explores intercultural healthcare—defined as the integration of traditional medicine and biomedicine as complementary healthcare systems—in minority and underserved communities. This integration can take place at different levels: individuals (patients, healers, biomedical healthcare providers), institutions (health centers, hospitals) or society (government policy).

Background: Contemporary ethnobotany research of traditional medicine has primarily dealt with the botanical identification of plants commonly used by local communities, and the identification of health conditions treated with these plants, whereas ethnopharmacology has focused on the bioactivity of traditional remedies. On the other hand, medical anthropology seems to be the scholarship more involved with research into patients' healthcare-seeking itineraries and their interaction with traditional versus biomedical healthcare systems. The direct impact of these studies on public health of local communities can be contested.

Aim of the review: To compare and discuss the body of scholarly work that deals with different aspects of traditional medicine in underserved and minority communities, and to reflect on how gaps identified in research can be bridged to help improve healthcare in these communities.

Key findings: The literature covers a broad range of information of relevance to intercultural healthcare. This information is fragmented across different scientific and clinical disciplines. A conceptual review of these studies identifies a clear need to devote more attention to ways in which research on traditional medicine can be more effectively applied to improve local public health in biomedical resource-poor settings, or in geographic areas that have disparities in access to healthcare.

Conclusions: Scholars studying traditional medicine should prioritize a more interdisciplinary and applied perspective to their work in order to forge a more direct social impact on public health in local communities most in need of healthcare.

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* Tel.: +1 718 817 8941; fax: +1 718 220 1029.

E-mail address: ivandebroek@nybg.org

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1. Introduction

The present conceptual review paper explores intercultural health-care in minority and underserved communities (collectively called here “local communities”) that have a long history of using herbal remedies in traditional medicine. *Traditional herbal medicines* can be defined as “naturally occurring, plant-derived substances with minimal or no industrial processing that have been used to treat illness within local or regional healing practices” (Tilburt and Kaptchuk, 2008). *Intercultural healthcare* consists of “practices in healthcare that bridge indigenous medicine and western medicine, where both are considered as complementary” (Mignone et al., 2007). Within this context, *indigenous or traditional medicine* stands for “the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses” (World Health Organization, 2000). This includes, among others, consultation with traditional and spiritual healers, herbalists, birth attendants, bone setters, diviners and others, as well as the use of plants, animals and minerals for self-medication. For the purpose of the present manuscript, the term *indigenous* is expanded to include all local communities worldwide that use traditional medicine as part of their cultural heritage.

According to the World Health Organization, *health* is “a state of complete physical, mental and social well-being” and not merely “absence of disease or infirmity”. This definition corresponds well with the inclusive nature of traditional medicine that extends beyond the physical body into a broader social, cultural and spiritual context of health and well-being. The importance of traditional medicine in global healthcare is reflected by the three A’s: Affordability, Availability and Accessibility. This is especially true in rural areas lacking in biomedical healthcare, but also in immigrant communities in large urban centers, regardless of the increased availability of biomedicine in the latter places (Pieroni and Vandebroek, 2007).

Even though the World Health Organization has continued to endorse traditional medicine since the seventies, implementation of intercultural healthcare in practice has proven a difficult task for most countries to date. This may be due, in part, to the strained institutional relationships between both healthcare systems. With the exception of some countries, for example China, the Republic of Korea and Vietnam, the position of traditional medicine in relation to the predominance of the biomedical healthcare system remains much debated (Payyappallimana, 2010). At the societal level, several barriers to intercultural healthcare are known to exist, such as its general acceptance by biomedical healthcare providers, and issues related to the safety, efficacy, quality and rational use of traditional medicine. Furthermore, debate has been ongoing whether both medical systems should be integrated, or rather allowed to co-exist. Others argue that traditional medicine needs to be evaluated within its own framework rather than approved and subordinated by the rules of biomedicine (Gorn and Sugiyama, 2004). The difficult institutional relationship between traditional medicine and biomedicine stands in sharp contrast to its reality in the daily lives of many people, who often spontaneously use both systems together, either subsequently or jointly, and consider them as complementary systems instead of being mutually exclusive (Gorn and Sugiyama, 2004; Payyappallimana, 2010).

Ethnobotanical research has a long history of investigating plants and health conditions that are important in traditional

medicine. For many years, one of the main interests of research into medicinal plants has been to identify new plant leads for drug discovery programs (Cox and Balick, 1994; Fabricant and Farnsworth, 2001). In spite of the importance of these programs to improve general public health, their short and long term impact on public health in local communities is less clear and has often been overlooked, especially in societies that do not have the purchasing power for marketed pharmaceuticals (Nyigo and Malebo, 2005). The main objective of this conceptual review is to compare and discuss the body of scholarly work that deals with different aspects of traditional medicine in local communities, and to reflect on how gaps identified in research can be bridged to help improve healthcare in these communities.

It is important to emphasize that this is not a systematic review aimed at generating an exhaustive summary of literature studies that deal with traditional medicine and intercultural health. As a consequence, some studies are not cited. The ones that are cited illustrate the main arguments put forward in this paper and will inevitably include a certain degree of author bias. Rather, this review is conceptual and was guided by my understanding of the scholarship that studies traditional medicine, as well as by a literature search on the key-words “traditional medicine” in combination with “public health”, “primary healthcare”, “biomedicine” or “intercultural health” in Ovid Medline from 1980 to 2013. Studies selected from this literature search were compiled in a Microsoft Excel table and summarized by their main focus of inquiry. From this exercise, five main types of studies were identified that are discussed in the following paragraphs. In addition, two initiatives in which I have been involved are also described; these initiatives attempt to bridge academic and applied research through interactions with communities that use traditional medicine and biomedical healthcare providers.

The main argument put forward in this manuscript is that scholars studying traditional medicine should prioritize a more interdisciplinary and applied perspective to their work in order to forge a more direct social impact on public health in local communities. The importance of this social dimension of traditional medicine became a priority to me through observations from fieldwork that in some communities medicinal plants continue to be the main (or in more pronounced cases the only) available, accessible or affordable option for healthcare (e.g., Vandebroek et al., 2004a). These observations were reinforced by the perceived lack of coverage in the ethnosciences literature of research activities that can directly contribute to mitigating this health disparity.

2. Literature on the role of traditional medicine in intercultural health

Existing literature on the role of traditional medicine in intercultural health can be roughly classified into five orientations: (1) ethnobotanical studies of traditional medicine in local communities and ethnopharmacological research of the bioactivity of plants used in traditional medicine, (2) anthropological studies of local health beliefs and healthcare-seeking behavior, (3) studies that address the role of culture in the biomedical encounter, (4) general reviews about traditional medicine and public health, and (5) studies that focus on the implementation of intercultural health.

2.1. Ethnobotanical and ethnopharmacological studies of medicinal plants and their bioactive compounds

Ethnobotanical studies abound that list plants used in traditional medicine by different cultures (e.g., Jain et al., 2005; Uniyal et al., 2006; Benítez et al., 2010). Through interviews, ethnobotanists compile inventories of medicinal plants that are locally known and/or used, and list the health conditions for which these plants are used. Common plant names obtained through interviews are cross-linked with their botanical identifiers (Latin binomials) through fieldtrips for collection of voucher specimens, followed by plant identification in herbaria. In addition to compiling inventories, several studies also investigate the influence of psychosocial variables on plant knowledge, including age, gender, schooling, occupation, religion, incidence of illness and others (e.g., Quinlan and Quinlan, 2007). Some studies have begun to make a clear distinction between plant *knowledge* and *use* (Ceuterick et al., 2008), since people tend to use less plants than they actually know (Albuquerque, 2006; Srithi et al., 2009).

Ethnobotanical studies aimed at compiling lists of plants (and their uses) are very valuable to establish baseline data for comparisons across time and space. However, the relevance of this type of studies for improving local healthcare is at best indirect. Often, authors derive their conclusion that traditional medicine is important for public health solely from the observation that local people, often living in impoverished rural communities, hold substantial knowledge about medicinal plants (e.g., De Wet et al., 2010). From a public health perspective, these results remain far removed from their actual application in the field, community or clinic. Without further research into a particular local health situation, and answers to additional questions such as “for illness x, what is the prevalence of plant use as a first treatment option versus utilization of biomedicine?” and “how would a patient rate the efficacy of a particular plant remedy after its use?”, there simply is no way of knowing the contribution of medicinal plants (and traditional medicine) to local healthcare, unless communities are so isolated that no other form of healthcare is available to them within a reasonable proximity (Vandebroek et al., 2004a).

There exist volumes of ethnopharmacological papers reporting on the bioactivity of medicinal plant extracts and bioactive compound in preclinical (*in vitro* or *in vivo*) studies. Ethnopharmacologists have worked diligently to forge a better correspondence between traditional medicine and preclinical science. One of the criteria for publishing (adopted by the *Journal of Ethnopharmacology*) is that a specific plant use, extract or dosage studied in the laboratory should be directly related to its traditional use. In spite of these requirements, it usually remains unclear how to extrapolate results from these preclinical studies to the clinical practice. Furthermore, in assessing the value of medicinal plants for improving local healthcare, how should ethnopharmacologists balance time and effort to studying the efficacy versus safety of plant extracts? Only very few ethnopharmacological studies demonstrate how this research has shown support for effectively improving public health of local communities (Graz et al., 2010b). Reyes-García (2010) concludes that “Ethnopharmacologists can work with health care providers in the developing world for the local implementation of ethnopharmacological research results.” Graz et al. (2010a) also “call for better cooperation between ethnopharmacologists, physicians, traditional healers and the populations concerned: that is the condition for ethnopharmacological work to be useful at the level of local populations and, if included in a development project, for the design of sound health policies.” It is encouraging to see that ethnopharmacological studies are increasingly targeting diseases that are more relevant to the epidemiological reality in developing countries, including malaria (Bourdy

et al., 2008), and HIV (Tshikalange et al., 2008). It is also good news that simple laboratory methods carried out in low-tech laboratories in developing countries are being recognized as suitable first-line assessment tools (Bussmann et al., 2011).

2.2. Anthropological and other social science research into local health beliefs and practices

Social science-oriented papers provide much-needed insights into healthcare-seeking choices of community members in impoverished rural areas, or transnational migrants in urban environments, especially in relation to their use of traditional medicine versus biomedicine (De Mello Amorozo, 2004; Vandebroek et al., 2004a; Giovannini et al., 2011). Other research papers describe how cultural beliefs, identity, emotions, as well as social, political, environmental, and spiritual relationships between communities and their environment, shape the culture-specific experience and meanings of illness (Greenway, 1998). For example, Bastien's work shows how Andean understanding of the human body as a mountain with waterways explains the logic behind Andean treatments with carminatives, emetics, enemas, fasting, dietary restrictions, and baths to purge the body from excess fluids (Bastien, 1985). In Brazil, women use the term “swallowing frogs” to voice their silent suppression of anger which they see as the cause for several folk illnesses such as the evil eye, nerves, fright illness, open chest and blood-boiling bruises (Rebhun, 1994). Other studies have pointed to the association between these folk illnesses and increased levels of morbidity and mortality (Baer and Bustillo, 1993). In addition, there are social science studies that describe how these cultural beliefs influence local preference for traditional medicine (Quinlan, 2010). Some studies juxtapose both healthcare systems, whereby biomedicine is believed to displace traditional medicine, whereas others have found that biomedicine and traditional medicine can co-exist and complement each other (Vandebroek et al., 2008; Giovannini et al., 2011). For example, Mathez-Stiefel et al. (2012) found that the health-seeking strategies of Andean households were independent of their level of access to biomedicine (in terms of quality of services provided, physical accessibility, and financial affordability). This study showed that traditional medicine coexisted with biomedicine and was preferred for illnesses with a strong cultural component—named folk illnesses—that are relevant within the local cultural context (Mathez-Stiefel et al., 2012). The authors also found that in local people's minds, traditional medicine and biomedicine were complementary and used interchangeably.

Several other social science-oriented papers have reported on the perceptions and opinions of different stakeholders in relation to the integration of traditional medicine in public health (Birhan et al., 2011; Gyasi et al., 2011; Kayombo et al., 2012). However, most papers reflect the opinions of policy makers, physicians, health facility managers, traditional healers or users of traditional medicine, instead of the opinions of a representative sample of community members. Van der Geest (1997) has written a provocative essay about the role of traditional medicine in basic health services in Africa. In his essay, he pointed out that the community perspective is lacking in most intercultural healthcare studies. According to Van der Geest, studies on plant medicines used at home for purposes of traditional self-medication are also lacking in the literature, although the ethnopharmacological and ethnobotanical literature seems to be catching up on this subject (e.g., Picking et al., 2011). Van der Geest (1997) further speculated that local communities may prefer improvements in basic biomedical healthcare instead of integrating traditional healers into the biomedical healthcare system. Among the reasons for this, he wrote, are that patients already know which system they prefer to use for specific complaints.

Anthropological studies usually rely heavily on ethnographic data and tend to pay less attention to proper botanical identification of plants used for healing purposes, if plants are listed at all in these publications. These papers often also fail to discuss how the results can be useful to public health. A previous comment can also be applied here: designing studies that transcend disciplines would allow a broader and deeper understanding of the different steps people take throughout their healthcare seeking process. At the beginning of this process is the task to understand how cultural beliefs influence the healthcare choices that patients make. At the end of this process is the monitoring of the health outcomes of these choices. A clearer link to public health can be established through capitalizing on the strength of additional specialties in anthropology, such as epidemiological research into the prevalence rates and differential risk factors of folk illnesses (Carey, 1993).

2.3. Studies that address the role of culture in the biomedical encounter

It is well-known from the literature that culture has a profound impact on biomedical healthcare (Bussey-Jones and Genao, 2003). Among the key issues identified for biomedical healthcare providers to improve so that they can optimize their interactions with patients from different cultures are: language, knowledge of their patients' concomitant or subsequent use of traditional medicine (including herbal remedies), and awareness of cultural differences in thresholds for seeking healthcare from physicians versus traditional healers (Bussey-Jones and Genao, 2003). Bastien (1982) described how biomedicine in rural Andean Bolivia has not been able to articulate well with traditional medicine, in spite of the increasing availability of the former. According to Bastien, the problem is not that Andean people do not accept the cures of Western medicine, but that they experience difficulties in incorporating biomedicine into their own economic, cultural and social realities. Bastien provided suggestions for biomedical healthcare providers to make their practice more in line with Andean cultural customs, for example by being open to visiting patients at home and accepting non-monetary reciprocity of services (medical treatment for labor instead of cash).

Patient beliefs about the causes of disease or discomfort can also have profound effects on health outcomes. A study among 35 Latino patients in Colorado who spoke Spanish only found that the majority of patients believed that *susto* (a sudden profound fright believed to have long-term physical and emotional consequences) was partly responsible for their diabetes. Many patients in this study also frequently treated themselves with home remedies (Sullivan et al., 2010). The authors concluded that diabetes management programs should incorporate these traditional beliefs into a workable treatment regime. Folk illnesses such as *susto* (fright), *empacho* (gastrointestinal blockade), *mal de ojo* (evil eye) and others are good examples of cultural patient-held beliefs and behaviors that are discordant with those of biomedicine (Baer and Bustillo, 1993). A survey among Latinos in northern Manhattan found that some respondents believed that upper respiratory infections may be caused by *mal de ojo* (evil eye) or *susto* (fright) (Larson et al., 2009). How a biomedical healthcare provider reacts to these beliefs will greatly influence the quality of the clinical encounter. Key factors to delivering culturally sensitive biomedical healthcare include becoming aware of commonly held folk medical beliefs in a community, as well as non-judgmental inquiry about patients' adherence to these ethnocultural beliefs and behaviors (Pachter, 1994).

Interestingly, when discussing sources of specific information on ethnomedicine and folk illnesses, biomedical healthcare providers often refer to the social sciences and clinical literature, and

seem to overlook the ethnobotanical literature, although they acknowledge in generic terms that herbs are commonly used by different cultural groups (Pachter, 1994; Zapata and Shippee-Rice, 1999). One major limitation of the literature sources biomedical healthcare providers rely on, is that plant remedies are often described only by their common names (Risser and Mazur, 1995; Allen et al., 2000; Poss et al., 2005), sometimes even exclusively listed as names translated to English (Zapata and Shippee-Rice, 1999; Gardiner et al., in press), sometimes as generic descriptions of "herbal teas", "herbal remedies" or "root extract" (Gardiner et al., in press; Sullivan et al., 2010). Alternatively, when scientific names are provided, then misspellings can be common and/or no voucher specimens are listed (Pachter et al., 1995; Allen et al., 2000). This problem may be less of an issue for commonly known plants such as *apio* (celery) or *manzanilla* (chamomile), but may be serious in the case of uncommonly known plants. For example, the use of "guamo" for treatment of asthma by Puerto Ricans in the United States may—or may not—be the "cow's regurgitated grass" that the authors mention in their paper (Zayas et al., 2011). Without information of how the authors cross-linked common names in local languages with corresponding English names, nor any mention of adequately prepared voucher specimens, there simply is no way of knowing the proper botanical identity of an herbal remedy. Consequently, there is no knowledge available about that remedy's potential hazard for human health through searches of biomedical databases such as PUBMED. Even in the two publications for a medical audience that specifically expressed the need for a Latin botanical binomial name to obtain correct information on the pharmacological activity of uncommonly known herbs, that name was ascribed to species through consultation of already published reference works (Allen et al., 2000; Whelan and Dvorkin, 2006). Botany 101 teaches us that the only way to correctly identify the botanical name of a plant is through collection of a voucher specimen, use of botanical keys, and comparison with reference material in herbaria (Bennett and Balick, 2008). It goes without saying that original ethnobotanical fieldwork is the best choice to obtain unequivocal information about the correct botanical identity of medicinal plants used by different cultural groups.

2.4. Review papers about the general role and importance of traditional medicine in public health

A recurrent theme in review papers on traditional medicine and public health is the continued and increasing use of traditional medicine around the world, including herbal remedies (Hoareau and DaSilva, 1999; Bodeker and Kronenberg, 2002; Pal and Shukla, 2003; Elujoba et al., 2005; Alves and Rosa, 2007; Tilburt and Kaptchuk, 2008; Payyappallimana, 2010). From these reviews, the following three remarks can be made. First, there is a major emphasis on the development of plant remedies as sources of new natural products, without further reflection on how potential drugs will be easily obtained by poor local populations most in need of these products. This comment does not even take into consideration the extraordinary long time (20+ years) required for drug development. Second, most attention for herbal remedies has been directed to address issues of quality control and standardization (efficacy, safety and reproducibility), as well as regulation through national policies, with a general neglect of wider public health dimensions (Bodeker and Kronenberg, 2002), especially in the case of meeting the unmet needs for healthcare of rural households with limited availability of (or access to) biomedical care. Third, there often is an emphasis on collaboration with traditional healers, who hold specialist knowledge, whereas much less attention has been paid to "domestic medicine" that takes place at the household level under the care of non-specialist family members (often mothers) (McDade et al., 2007) and the extended network of friends and

neighbors. Several self-limiting diseases, such as the common cold, flu, acute upper respiratory tract infections, uncomplicated diarrhea and others are successfully managed at the household level through the use of home remedies (e.g., Mwambete and Joseph, 2010). Another group of illnesses commonly treated at home with herbal remedies consists of chronic health conditions such as diabetes, arthritis, and asthma (Zayas et al., 2011). Furthermore, in most rural places, reproductive health and nutrition are two important aspects of household care (Payyappallimana, 2010). Hence, it would be opportune to favor domestic medicine as one of the priority areas for future research and intervention programs.

From a public health perspective, much of the debate around traditional medicine seems to be geared around its potential as an economic commodity, regulatory issues of safety, efficacy and quality, as well as ethical issues involving protection of traditional knowledge from misappropriation, and ecological aspects related to the preservation of traditional knowledge and associated genetic resources (Alves and Rosa, 2007). As long as the debate remains dominated by these topics, there seems to be little room to address local public health impacts directly. Immediate unmet needs of communities lacking in basic primary healthcare should be taken into account in these research and policy agendas. An ethical dilemma that looms is the following: should we wait for positive evidence from costly randomized, double-blind, placebo-controlled trials if local herbal remedies represent the only treatment option for a community and/or are commonly used in that community (Graz et al., 2007)? Or, should we rather direct the bulk of our attention toward ethnobotanical and ethnopharmacological studies that provide basic pre-clinical evidence on toxicity and/or efficacy of plants to support clinical recommendations for the traditional use of these remedies in local communities? Moreover, how will research validate in a timely manner the large diversity of traditional medicines that many of these communities know and use on a daily basis to treat many different illnesses? And how will the results of these assessments be translated into practical recommendations to improve community health in areas lacking in availability of, or access to, biomedical healthcare?

2.5. Studies on experiences in intercultural health, including methodological aspects

Projects that aim at bridging the gap between traditional medicine and biomedicine tend to follow a more applied approach than research-oriented studies. The Traditional Medicine in the Islands (TRAMIL) program has been operative since 1982 with the goal to identify, validate and diffuse information on the use of medicinal plants for public health in the Caribbean (Boulogne et al., 2011). Its methodology combines quantitative ethnobotanical surveys, botanical voucher collection, plant identification, ethnopharmacological literature reviews, and original laboratory studies on the phytochemistry, biological activity and/or toxicity of selected medicinal plants. This information is subsequently discussed within the TRAMIL group that issues recommendations on plant use through the publication of several reference works. These works contain plant monographs with information on medicinal plant uses for public health assessed by the network as “recommended”, “toxic” or “subject to investigation” (Germosén-Robineau, 2005).

The TRAMIL strategy represents a model approach for the validation of herbal remedies for public health in the Caribbean. In many countries, however, there remains great concern by biomedical healthcare providers about translating preclinical research data of plant medicines into the clinical practice, especially if these data are based solely on *in vitro* and *in vivo* studies. In an attempt to address the shortage of clinical data for less commonly known plants, Graz and co-workers designed a low-cost

clinical trial in Mali to assess the effectiveness of *Argemone mexicana* L. (Papaveraceae), a herbal remedy to treat malaria, with good clinical outcomes (Graz et al., 2007; Willcox et al., 2007). In addition, these authors called for the collection of basic clinical data in the field by ethnobotanists and ethnopharmacologists to obtain a user's perspective on the effectiveness of plant remedies and pinpoint the most effective plant species for a given ailment (Graz et al., 2010a).

Effective communication between health specialists from different cultures increases as they become more aware of the similarities between them, and of the fact that they both share the same goal: to promote health in a patient (Graz et al., 2010a). This is also true for the relationship between biomedical healthcare providers and their patients. In an attempt to improve cross-cultural understanding and communication, Bastien (1987) described methods for teaching traditional concepts of health and disease to healthcare providers (physicians, nurses and assistant nurses), and promoted the use of myths to teach rural people about biomedicine in Andean Bolivia. He also provided valuable lessons from experiences with training community health workers in rural areas. These lessons underscore the importance of recognizing different cultural perspectives, expectations and practices between local people and Western-trained practitioners and scientists in healthcare (Bastien, 1990). Kayombo et al. (2007) warned that developing a meaningful collaboration between traditional healers and biomedical healthcare providers in Tanzania is a long process that needs to be developed systematically. A study in Botswana showed that biomedical healthcare providers only wanted to collaborate with traditional healers on their own terms, which included unilateral referral (from healers to them) and teaching healers about biomedicine, without perceiving the need to learn anything from traditional medicine (Madiba, 2010).

A discussion of case studies on intercultural health initiatives in five Latin American countries highlighted “the political tensions between state-run health systems and the largely marginalized practices of traditional healing” and pointed to the need for developing a culturally appropriate regulatory environment (policy) and the prioritization of studies demonstrating the effectiveness of herbal remedies (Mignone et al., 2007). On a more optimistic note, the paper described that these initiatives seemed to promote faster and better referrals when more advanced biomedical care was needed. In addition, they brought about a sense of cultural pride among the indigenous communities involved (Mignone et al., 2007).

3. Two other case studies on improving the role of traditional medicine in public health

In the next paragraphs, two projects are described in which I am involved that were developed from at least two immediate healthcare needs of local communities identified through the literature: (1) improved communication between traditional healers and biomedical healthcare providers; and (2) better acceptance of patients' cultural beliefs and practices by biomedical healthcare providers.

3.1. Workshops on intercultural healthcare in the Bolivian Amazon

Ethnobotanical research in the Bolivian Amazon from 2001 to 2005 (Vandebroek et al., 2004a, 2004b; Thomas and Vandebroek, 2006; Vandebroek, 2010) identified an almost total absence of biomedical healthcare in Yurakaré and Trinitario indigenous communities in the Indigenous Territory and National Park Isiboro-Sécure (TIPNIS) in the Department of Cochabamba. Some communities had the possibility to access nearby primary healthcare units

present in neighboring settlements of highland farmers who colonized the area since the 1970s, but were usually reluctant to do so. As a result, the more isolated indigenous communities relied entirely on medicinal plants and traditional healers to meet their primary healthcare needs (Vandebroek et al., 2004a). As a follow-up to the ethnobotanical research project, a more applied spin-off project was therefore developed, consisting of community health workshops. The goal of this spin-off project was promoting dialogue between biomedical healthcare providers and traditional healers about frequently occurring health problems in the communities. The main idea was for the two groups of health specialists to reach consensus about the best ways to deal with these conditions.

Workshops took place in Eterazama, a small village close to the lowland rainforest home of the indigenous communities. Biomedical healthcare providers who participated in the workshops were staff and medical students in training from the Department of Tropical Medicine (CUMETROP) of the Bolivian *Universidad Mayor de San Simón*; traditional healers were members of Yurakaré and Trinitario communities. Nursing students from the *Centro de Formación Tecnológico Eterazama*, a vocational school where the workshops took place, participated as well. The total number of participants fluctuated between 20 and 40.

Four workshops were organized over the course of one year. Each workshop lasted three days and consisted of lectures with Q&A, group exercises, practical demonstrations, and class discussions. The topics of the workshops focused on health conditions prevalent in the tropical study area, including their signs, symptoms and treatments according to biomedicine and traditional medicine. Health topics included: accidents caused by insects, snakes, spiders and scorpions, and illnesses caused by infections with intestinal parasites (workshop 1); gastrointestinal ailments and child health (workshop 2); respiratory ailments, diabetes, nutrition and reproductive health (workshop 3); dermatology, toxicology and traumatology (workshop 4). A Spanish-language ethnobotanical guidebook with plant monographs and pictures developed for the community through previous ethnobotanical research (Thomas and Vandebroek, 2006) served as a basis for stimulating discussion about medicinal plants that were mentioned during the workshops and their biological properties known from the biomedical literature.

The positive impact of these workshops could be gradually observed. At the beginning of the cycle of workshops, there existed a lot of reservation from traditional healers and indigenous community members to openly share cultural knowledge and beliefs about health conditions, their causes and treatments to outsiders. However, by focusing on similarities—instead of differences—between ways of diagnosing and treatments, the group of participants was able to overcome barriers for dialogue. Medical students expressed great appreciation for the diversity of cultural knowledge held by indigenous participants about natural resources, illness and healthcare. A second year medical student from the *Universidad Mayor de San Simón* said: “It is amazing, all those names they have for what we call snake” (Guadalupe G., pers. comm.). Trainees were able to witness first hand that traditional healers were well aware of potential dangers associated with the use of certain plant species as medicines. Traditional healers also stressed the importance that plant remedies be administered in the communities under their supervision stating that inadequate use can result in death of the patient. Finally, the workshops demonstrated the powerful role of cultural beliefs about the causes of illnesses in the type of treatment that was chosen for a given disease. Through interaction and dialogue, participants were able to evaluate their own healthcare system within an expanded context that represented a rich diversity of health beliefs and healthcare practices. One of the elements that traditional healers

spontaneously adopted from these workshops was their suggestion that, as a group of healers, they should come together again to discuss standardization of plant preparations in order for their traditional medicines to be safer and more effective.

At the end, traditional healers and indigenous community members were asked to share their opinions about the workshops with the classroom. Their suggestions for improvement covered four themes: (1) place (2) language, (3) timing, and (4) gender. These themes can be understood as follows: (1) future intercultural workshops should be held *in situ* in the indigenous communities instead of at an outside venue to accommodate participation of a larger group of people and to allow participants to better understand the healthcare challenges of these communities; (2) the use of technical biomedical language in the presentations should be limited to an absolute minimum to improve cross-cultural communication; (3) the timing of workshops should be adapted to accommodate for the day schedule of indigenous community members who tend to rise when the sun comes up and go to bed when the sun goes down; (4) participation of women (who are the main caregivers at home) should be encouraged so that their voices can be empowered. As moderator to the workshops, I would like to suggest a fifth element, immersion: (5) pre-workshop exercises (with biomedical healthcare providers and medical students) before the start of the actual workshops will allow to maximize bidirectional communication with traditional healers and indigenous community members (learning how to communicate *with* someone, as supposed to *at* someone, which tends to be a more common experience in the clinical practice).

3.2. Cultural competency training of healthcare providers in New York City

Ethnic minorities will comprise the majority of the United States population by 2050 (Passel and Cohn, 2008), a demographic trend that represents an increase in cultural diversity (Galambos, 2003). Addressing the health needs of this diverse population has become an increasingly visible public policy goal (Brach and Fraser, 2000). When people from different cultures come to the United States, they bring with them their own cultural beliefs about the symptoms and underlying causes of illnesses, and preferred cultural treatments for these illnesses, including the practice of using unprocessed medicinal plants imported from their home countries (Allen et al., 2000; Poss et al., 2005; Sullivan et al., 2010) and consultation with traditional healers (Murguía et al., 2003). Patients usually do not disclose these cultural beliefs and practices to biomedical healthcare providers (Murguía et al., 2003; Poss et al., 2005). As such, these cultural beliefs and practices may interfere with the utilization of biomedical healthcare, lead to non-adherence to prescribed biomedical treatments, or produce undesired herb–drug interactions. Cultural competence in medicine is based on the urgent need to develop training programs for medical students, residents and practicing healthcare providers to make them more aware of the cultural beliefs and practices of their immigrant patients and help them establish a more open and trusted provider–patient dialogue (Berlin and Fowkes, 1983; Thom et al., 2006).

The Ethnomedicine Program at The New York Botanical Garden's Institute of Economic Botany was designed to help improving healthcare to Latino immigrant communities in New York City through a combination of research and training activities. Original ethnomedical research into cultural beliefs about folk illnesses and self-medication practices with medicinal plants by three Latino communities (Dominicans, Puerto Ricans and Mexicans) was used as a basis to develop curricular materials and implement training activities with biomedical healthcare

providers, residents and medical students¹. The Garden is an ideal partner to spearhead a cultural competency training program about cultural beliefs and self-medication with herbal remedies because of its established expertise in the identification of medicinal plants and ethnomedical research.

Training activities developed through this Program were tailored to the specific interests of each medical school, hospital, or community clinic with which training was arranged. Activities consisted of Powerpoint presentations of on-going Latino ethnomedicine research, guided visits to the living plant collection at the conservatory greenhouse of The New York Botanical Garden to discuss the biological activity and toxicology aspects of culturally important medicinal plants, mentoring on non-judgmental interviewing of patients about folk illnesses and herbal remedies during medical residents' 4-week immersion stay in a community clinic, classes of ethnomedical Spanish, role play exercises to discuss specific case scenarios of folk illnesses, and guided visits to New York City *botánicas* (retail stores found in Latino neighborhoods that sell dry and fresh plants, as well as non-plant based products, to promote and treat physical health and spiritual well-being) (Viladrich, 2006).

Of these different activities, trainees expressed particular appreciation for guided visits to *botánicas* where they were able to interact directly with Latino staff about cultural aspects of healthcare. On the other hand, during their immersion in a community clinic, students sometimes reported they still experienced difficulties in getting people to open up to them about their use of herbal remedies, even after training exercises that focused on addressing these issues in a friendly, matter-of-factly and non-judgmental way. Furthermore, several biomedical healthcare providers expressed during training that preclinical evidence about the biological activity of plant extracts has limited meaning to the reality of their clinical practice. This issue deserves further discussion in the ethnopharmacological literature. Several trainees emphasized their lack of awareness about the omnipresence and popularity of Latino communities' beliefs in folk illnesses, such as the "evil eye" and others, and the popularity of culturally familiar herbal remedies. They vouched to use this increased awareness to improve the relationship with their patients, as illustrated by the following quotes of fourth year medical students:

"Overall, I believe that I gained a lot of valuable information and insight into the culture and practices of many different Spanish speaking populations in NYC. I have never before had this amount of exposure to something that is so integral to a large part of my surrounding community. What I believe will benefit me the most in the future is this foundation of knowledge which will hopefully allow me to gain the trust and faith of this [Spanish – speaking, Latino] population [in New York City]. It is not important that I know everything about home remedies, but rather that I know enough to show that I am indeed interested in their culture. I hope that this simple demonstration of commitment and knowledge will help me gain a patient's trust and create a more constructive patient-doctor relationship" (Thomas S., pers. comm.).

"The more important thing is to get the dialogue with patients open so that they are willing to tell us when they use these cultural remedies rather than keeping it secret" (Alex S., pers. comm.).

Currently, our Program is evaluating the impact of training on trainees' culturally relevant knowledge, attitudes and practices

quantitatively. The continued need for cultural competency training in ethnically diverse environments stands in contrast to its current representation in medical curricula, where it is still mostly offered as elective courses instead of required classes. Moving forward, more activities and applied research programs, as well as advocacy from medical educators, are therefore needed.

4. Conclusions: moving toward a more integrated framework of studies on the role of traditional medicine in public health

The papers and projects discussed in this review show that the literature covers a broad range of information of relevance to intercultural healthcare. This information is fragmented across different scientific and clinical disciplines. A review of these studies identifies a clear need to obtain better insight into the interplay between communities' use of traditional medicine versus biomedicine in relation to cultural health beliefs and actual health outcomes. The literature also lacks a comprehensive assessment of the opinions and attitudes of local users and non-users of traditional medicine toward the integration of these two healthcare systems at the institutional level in different countries. Studies addressing these topics will *de facto* need to adopt an interdisciplinary approach. In summary, I believe that the sub-disciplines of ethnobotany and ethnopharmacology can assist in several ways to contribute to a less fragmented and more integrated framework of intercultural healthcare in underserved and minority communities, by conducting research that is designed and implemented to:

- (1) be of more direct value to local communities. Ethnobotanical research will be enriched if local knowledge about plants fits into a larger framework that also includes studying healthcare issues in a community from a broader perspective. For this, it is important to develop interdisciplinary collaborations, for example with epidemiologists to investigate distribution patterns of folk illnesses because these illnesses often make up a significant portion of local health complaints. The input from nutritionists to ethnobotanical studies of wild edible plants can be used to address any existing nutritional deficiencies in local communities. Collaborations between ethnobotanists and ethnopharmacologists can be instrumental in providing feedback to local communities about issues concerning toxicology, side effects, dosage and standardization of their traditional herbal preparations. This type of information can be returned to the communities in the form of workshops, printed publications in local languages and/or video (e.g., http://youtu.be/F3sC4F8F_II; <http://youtu.be/d1tr96vnPwo>; http://youtu.be/mblacEL_OK4).
- (2) focus on local public health priorities and reflect on how a particular ethnobotany or ethnopharmacology study can help mitigating those health concerns, which are often neglected diseases. For example, an integrated study on the prevalence, different treatment options and health outcomes for Leishmaniasis and its symptoms with an interdisciplinary team of biomedical healthcare providers, ethnobotanists, medical anthropologists and ethnopharmacologists can bring much needed healthcare to communities that are too physically isolated to receive continuous biomedical care.
- (3) investigate perceptions, beliefs, and attitudes about intercultural healthcare at different scales, ranging from the point of view of the individual patient to institutions, governments, and law because these different scales may represent contrasting opinions. Studying these different scales may provide better insight into the multitude of forces that are at play in

¹ The majority of training activities between 2007 and 2012 were scheduled with medical students and residents from Albert Einstein College of Medicine. Healthcare providers from other institutions who received training during this time period were affiliated with Montefiori Medical Center, Bronx-Lebanon Hospital Center, Metropolitan Hospital Center, Mount Hope Family Practice, South Bronx Health Center for Children and Families, and Walton Family Health Center.

the interaction between traditional medicine and biomedicine and help forge better integration of both.

- (4) provide results that are more directly relevant to the clinical practice. Examples such as observational studies (retrospective treatment-outcome studies), interventions (prospective dose escalating quasi-experimental clinical trials) (Graz et al., 2007), or even just collecting basic clinical data from medicinal plant users about beneficial and adverse effects of plant remedies can add a more clinically relevant perspective to ethnobotanical research (Graz et al., 2010a).
- (5) be conducted in a true partnership with local communities and local research institutions from start to finish, and published in a national scientific journal in local language(s) to build scientific and development capacity in the country where research is carried out.
- (6) be ethically sound. Research into medicinal plants used in traditional medicine has raised issues of intellectual property rights of local communities. The complex and often challenging ethical framework of working with traditional knowledge of local communities should not scare away researchers to help develop projects on improving intercultural health, should such a local demand exist. In addition to Prior Informed Consent and adherence to national regulations for accessing traditional knowledge, collaborations will be sustainable if there is continuous dialogue with local communities about (changes in) expectations, perceived risks, benefits or national policies during the course of research.

In conclusion, research designed for the benefit of local communities, planned and implemented together with these communities, so as to focus on local health priorities and design locally acceptable and achievable solutions, can boost the impact of scientific research on primary healthcare and uphold the potential to achieve true social value.

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