



Perceptions and uses of plants for reproductive health among traditional midwives in Ecuador: Moving towards intercultural pharmacological practices

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ABSTRACT

Despite the fact that plants have played an important role in midwifery in many cultures, there are very few in-depth studies on the plants traditionally used by midwives. The aim of this study is to analyse the perceptions and the uses of medicinal plants for reproductive health among indigenous midwives in the city of Otavalo, Ecuador. The article also aims to analyse the perceptions of traditional midwives regarding allopathic drugs for reproductive health and their possible overlapping uses of medicinal plants and allopathic drugs. The data are drawn from an ethnographic study carried out in Ecuador. In total, 20 traditional midwives have been interviewed. Individual and in-depth interviews also took place with a sample of 35 women as well as with five nurses and two doctors working at San Luis Hospital in Otavalo.

The study shows that cultural health management and the incorporation of the beliefs and practices relating to women's reproductive health can represent a starting point towards the search for more successful strategies in reproductive health.

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Introduction

Midwifery is the practice of assisting women through childbirth using natural procedures. It was practiced primarily among traditional peoples with limited access to biomedicine. However, today it is also practiced in Western societies as an alternative to biomedicine. In both cultural settings, midwifery involves providing health care, during pregnancy, childbirth, and postnatal care, to both the mother and newborn (Foster et al., 2004; Waldstein and Adams, 2006; Torres and DeVries, 2009).

Therapeutic pluralism is common throughout the world and can be understood as the coexistence, within the same society or group, of a number of health-care alternatives with diverse origins and treatment foci, representing different systems of medical practice and visions (Capuccio et al., 2001; Brown, 2008; Wiley, 2008; Etkin and Elisabetsky, 2005; Pesek et al., 2009).

Two systems of health care coexist in Ecuador. The traditional system combines elements of the indigenous system, the modifications brought by the Incas, and elements of medieval European medical theory and practice. The official medical system comprising both public and private institutions is inaccessible for large sectors of the population, due to shortages of manpower and materials and high costs of services. The official system tends to address itself

primarily to the relatively high income earning urban population. Ecuador's high infant mortality rate of 64/1,000 attests to the limitations of its health-care system. The traditional system provides care for much of the rural indigenous population and areas, where western medical care is not available, but it is also represented in the city (Pieroni et al., 2005; Sandhu and Heinrich, 2005).

There are several studies that have been made about traditional uses of plants in reproductive health by traditional midwives (*parteras*) in Ecuador (Bussmann and Sharon, 2006; Cavender and Albán, 2009) but very few studies in ethnopharmacology have analysed cultural traditional uses of medicinal plants for reproductive purposes among traditional midwives (Davis-Floyd and Robbie, 2001; DeVries, 2004; Helman, 2007; Langwick, 2008), as well as their perceptions and the possible syncretized uses of both allopathic treatments and medicinal plants.

The research questions that will be explored in this study are the following:

- What is the relevance of the uses of medicinal plants for reproductive health among the indigenous midwives in the city of Otavalo, Ecuador?
- Are there any differences in the perceptions of medicinal plants among the traditional midwives of different age groups and geographic background?
- What are the perceptions of traditional midwives regarding allopathic drugs for reproductive health? Are there any

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possible overlapping in the use of medicinal plants and allopathic drugs in the traditional midwifery practices?

- How do allopathic drug treatments for reproductive health and medicinal plants coexist together among traditional midwives?

In this article, we shall refer to the indigenous traditional practitioners who attend births as traditional midwives, or TMs, to distinguish them from the professional midwives, who have had formal education in western biomedical science and licensure, either as certified nurse-midwives or certified professional midwives, categorised by the WHO as skilled birth attendants. According to Foster et al. (2004), the term 'traditional midwife' attempts to find a balance between acknowledging a midwife's extensive skills and still distinguishing her from individuals with higher training. This term recognises in a respectful way the work of these practitioners as midwifery work. The term 'traditional midwife' also acknowledges the self-identity of these practitioners, while differentiating their training from a midwife who has undergone higher levels of education (Foster et al., 2004).

Traditional midwifery and ethnopharmacological uses of plants for reproductive health

Medicinal plants play an important role in pre- and post-natal care in many rural and urban areas of the world (Whitaker, 2003; Gollin, 2004; Hamilton, 2004; McNeely, 2005; Green et al., 2006).

Plants used to influence and treat obstetric and gynaecological conditions and disorders, such as fertility problems, birth control, complications during pregnancy and birth have been documented for various ethnic groups (Nigenda et al., 2005). The traditional knowledge about the use of these plants is often held by midwives and elderly women, who pass it among their family members (Cosminsky, 2001; Davis-Floyd, 2003; Nettleton et al., 2007; Cuerrier and Arnason, 2008).

However, in the context of the introduction and modernisation of primary health-care systems, and with training programs for traditional birth attendants in Western medicine, this traditional knowledge of traditional midwives has often been neglected (DeVries, 2004; Walsh and Downe, 2004; Baer, 2005; Hobson, 2006; Calvet-Mir et al., 2008) although it is still widely used in South America by indigenous populations.

Ethnomedicine examines cultural notions and behaviour surrounding illness and medical treatment (Bailey et al., 2002; Janni and Bastien, 2004; Kisangau et al., 2007). Kirmayer (2004) states that folk medical systems operate in tandem with scientific biomedicine, and demonstrates how various folk medical practices, in addition to forming an integral part of community-based cultural identity and expression of culturally differentiated groups, converge and influence each other.

Ethnopharmacology is described as a field in close proximity to ethnobotany. It is the study of indigenous medicines that are almost always plant-derived. Despite the interdisciplinary nature of ethnopharmacology, much of its research has been exclusively based on the combination of the chemical, biological, and pharmacological sciences. Less attention has been given to the potential contributions of the social sciences, including anthropology and the study of traditional knowledge systems (see, for example, the work of Giovannini and Heinrich (2009), Thomas, Vandebroek, and colleagues (Pieroni et al., 2004; Vandebroek et al., 2004; Pardo De Santayana et al., 2005; Albuquerque and de Oliveira, 2007; Thomas et al., 2009)). When anthropological expertise and tools have been used, the main purpose has been to obtain catalogues of medicinal plant uses, which were often abstracted from their cultural contexts and subject to little analysis or interpretation (Etkin, 1988; Ellen, 1996).

Furthermore, more often than not, and especially when working among indigenous peoples, the sole purpose of obtaining those lists and catalogues has been to facilitate the intentional and focused discovery of active compounds. In sum, with certain remarkable exceptions and without undervaluing researchers who have catalogued the often threatened knowledge of medicinal plant uses, to date many ethnopharmacologists have limited themselves to document indigenous pharmacopoeias in the search for pharmacologically unique principles that might result in the development of commercial drugs or nutraceuticals (Pieroni and Price, 2006).

Etkin and Elisabetsky (2005) argued that the discipline should 'strive for a more holistic, theory-driven, and culture- and context sensitive study of the pharmacologic potential of (largely botanical) species used by indigenous peoples for medicine, food, and other purposes.' But ethnopharmacology cannot achieve these new goals without simultaneously adopting theoretical and methodological contributions from the social sciences. This article aims to contribute to that effort by analysing the values of medicinal plants used for reproductive purposes by indigenous midwives in Ecuador.

As analysed by Wiley (2008), human health should not only be understood from a biophysical point of view but also from a psychological, spiritual, and socio-cultural point of view. Similarly, each community has its own local diseases and health beliefs, and indigenous healers are able to understand the effective socio-cultural variables playing a major role in health conditions.

In the last few decades, there have been a few studies seeking to understand the use of medicinal herbs in Ecuador in their local context (Finnerman and Sackett, 2003; Shepard, 2004). Most of these works adopt a descriptive and pharmacological approach. In relation to the latest research, although these studies constitute an advance in the knowledge of the indigenous traditional medicine, they fail however to consider the socio-cultural context and symbolic aspects as they are focused on the therapeutical value of the plants. These studies infact generally give detailed descriptions of the uses, properties and the active phytochemical ingredients present in medicinal plants (Geurts, 2001; Sibley and Sipe, 2002; Bailey et al., 2005).

Methods

The data presented here is drawn from an ethnographic study carried out between April and June 2011 in the city of Otavalo, Ecuador. Otavalo is situated in the Imbabura province, at around 200 km from Quito and has a high population of indigenous people.

In total, 20 traditional midwives (*parteras*) were interviewed. In order to have a variety of points of view and experiences, midwives of different cultural, vocational backgrounds have been interviewed. The traditional midwives were all female and their age ranged between 43 and 75 years old. The midwives interviewed had an average age of 62 years, the level of education was generally primary education. Most interviewees were experienced midwives with 35–40 years of traditional midwifery practice.

Individual and in-depth interviews also took place with a sample of 35 women. These women, all living in Otavalo or its surrounding areas, had an age ranging between 25 and 46 years old. They both had an indigenous and a *mestizo* (non-indigenous) background and were all attended by the *parteras* at the hospital or at home. In order to have a wider range of experiences, both pregnant and postnatal women were interviewed. Central questions such as the definition of ethnicity and 'indigenous identity' have been addressed following the criteria of self-definition. In selecting these interviewees the question was asked whether

they considered themselves to be indigenous or non-indigenous. Although there were some interviewees that were dressed in the way indigenous people do and they were fluent in *quechua*, they declared that they felt uncomfortable with classifying themselves as indigenous. Thus, these interviewees had been classified as *mestizos* in order to mirror or not their own sense of belonging to an Indigenous group.

The questions asked the women aimed at exploring the perceptions of the patients on the role of the *parteras* at the hospital and their point of view regarding the traditional midwifery practices.

In order to learn of the women's experiences with doctors and traditional midwives without any possible forms of interference or pressure, semi-structured interviews with them have been conducted at their house.

In order to gather data on the possible interlinkages between traditional uses of plants for reproductive health and allopathic treatment and to complement the data already collected with the *parteras*, five nurses and two doctors working at the delivery yard of the San Luis Hospital in Otavalo were also interviewed. These interviewees were selected based on their professional experience and their familiarity with traditional midwives. Three of the medical staff were personally introduced to the author and the remaining four were sought at the hospital and their homes. The interviews with the *parteras* and the patients consisted of semi-structured questions in which general information was gathered on how knowledge of herbal remedies was relevant for the management of reproduction issues as well as the perceptions on their uses and efficacy for the treatment of reproductive health problems. These interviews had also the objective of gathering data on the perceptions of both traditional midwives and patients regarding allopathic drugs for reproductive health as well as any possible overlapping in the use of medicinal plants and allopathic drugs in the traditional midwifery practices. Upon consent of research participants, the interviews have been audio-recorded and transcribed verbatim. In this article, quotations are presented in English, which have been translated from Spanish. In order to ensure the privacy of the respondents, their names have been omitted or changed. The research received ethical approval from the University of Toronto, Canada. Formal consent to carry out the interviews with medical staff was obtained by the Director of the San Luis hospital in Otavalo.

Primary thematic categories such as sharing of knowledge process, types of knowledge (e.g. traditional knowledge and biomedical knowledge), participation of traditional midwives in training sessions, attitudes of biomedical staff etc. have been developed, followed by codes for subthemes. Independent coders established reliability in the use of the coding system before all excerpts had been formally analysed. Overlaps or distortions of data, thematic categories have been refined, merged or subdivided in an iterative process. Data have been summarised thematically and with illustrative quotes to capture the range of perspectives represented in the interviews.

The common local names of plants included in the free-lists were correlated with scientific names, using published materials on Ecuadorian herbal medicine. In general, cited plants were well-known local plants, whose names refer to a single species. Plants were classified following the nomenclature of Sparre and Harling (2006) and Béjar et al. (2001).

Results and discussion

Plants for reproductive health used by traditional midwives

Interviews with the *parteras* highlighted that there is an average of 40 plants that were used for maintaining women's

reproductive health. From plants that must be eaten by a pregnant woman to help her baby develop healthily, to those used during labour to speed up the contractions, to others that are used in the postpartum period to help the uterus settle and help the woman get back to normal equilibrium, plants were used regularly and intensively to achieve good health among the *parteras* interviewed (see Table 1 for the plants most commonly used by the traditional midwives in area under study in Ecuador).

In indigenous cosmology of Ecuador, everything is animated, personified and conceived to be capable of interacting with humans. Plants, animals, rivers, lakes, rocks, the earth, the sun and the moon are all animated by the holy forces of nature (Langwick, 2008).

The traditional midwives interviewed explained that the 'hot' and the 'cold' elements in the indigenous culture represent all that is masculine and feminine respectively, such as the certain types of food, organs of the body, mineral elements and plants. It is also believed that the elements of 'hot' and 'cold' are present in the body of the person and an imbalance between them could potentially create a disease. As the participants emphasised, the plants, being classified too in the categories of 'hot' and 'cold' had different properties and effects on the body. The 'cold' plants had the capacity of relieving the excessive heat concentrated in the body, especially in the organs or areas that are susceptible to heat. A 'cold' plant may be found in the wilderness and generally grows in humid sites. Its appearance is green and tender and its taste and smell are pleasant. 'Hot' plants are those that cause a sensation of heat when consumed. They generally grow in sandy, dry land and look thorny and rough. They are less juicy than 'cold' plants and their flavour and odour are more intense (see table 1 for the classification of plants according to their 'hot' or 'cold' properties).

A midwife in her late 50s explained:

plants can be classified in two categories: 'hot' plants and 'cold' plants. it is very important to know which plants are 'hot' and which plants are 'cold' as they have different therapeutic uses, especially among pregnant women...the body condition of a pregnant woman is normally hot... that is why cold plants should be administered in order to counter-balance this corporal state...

A medication prepared with 'cold' plants helps in relieving excessive heat in the body, while a medication prepared with 'hot' plants helps in reducing the cold in the body.

Many of the temporally 'cold' plants were used to treat conditions related to birth. The birthing process and the associated blood and fluids were considered extremely hot and hence dangerous to other people. People who were particularly susceptible to the danger from blood are those who had weaker constitutions, such as the elderly, children, and other pregnant or lactating women. The birth fluids were considered so hot (and polluting) that they could burn and hurt someone who is unprepared and/or uninitiated in healing. Only a midwife is deemed able to withstand the polluting and burning properties of blood and to bring the mother–baby dyad back into balance.

Coldness may refer to the physical state of the pregnant woman's body, which may be cold to the touch, or it may refer to the belief that her uterus is too cold for the fetus to descend. Many herbal remedies were administered during childbirth for the purposes of speeding labour by warming the parturient's body. The principles of 'hot' and 'cold' and the relative theories of humoral medicine can be found in ethnobotanical several studies undertaken in Latin America (Idoyaga Molina, 2000; Hilgert, 2001; Scarpa, 2004). According to these theories, the aetiology of diseases can be explained with an imbalance caused by the

Table 1

Different plants used by the traditional midwives for reproductive health.

Local/vernacular name	Botanical name	Therapeutic use	Part of the plant used	Type of energy
Apple	<i>Malus comunis</i> L.	Used against anaemia and constipation during pregnancy	Fruit	Cold
Camote	<i>Batatas edulis</i>	Used 15 days before the delivery to facilitate the delivery	Leaves	Hot
Chihualcan	Unknown	Used for constipation, pregnancy pain	Fruit: in cases of constipation Leaves: for pain during pregnancy	Hot
Chilca		Used to facilitate the dilation of the cervix, against labour pain	Leaves	Hot
Chirimoya	<i>Anona chirimolia</i>	Used to speed up the labour and delivery Also used to relieve stomach pain and diarrhoea during pregnancy	Leaves	Hot the leaves and cold the fruit
Congona	<i>Peperonia congona</i>	Used against uterine pain and depression in pregnant women	Leaves	Cold
Culantrillo de pozo	<i>Adiantum aethiopicum</i>	Used against postpartum haemorrhage, to place the baby in the right position inside the womb	Leaves	Cold
Guarango	<i>Caesalpinia spinosa</i>	Used against infection of the womb after childbirth	Leaves and fruit	Hot
Hierba buena	<i>Mentha piperita</i>	Used for pain of the womb	Leaves	Hot
Fig tree	<i>Ficus carica</i> L.	Used for irregular menstruation and menopause	Leaves	Hot
Jimbugata – Hierba de madre	<i>Desmodium intortum</i>	Used to reduce bleeding after delivery	Leaves and root	Hot
Llantén – Llantén Huarmi	<i>Plantago mayor</i> L.	Used against exhaustion after the delivery	Leaves	Cold
Mais	<i>Zea mays</i>	Used to increase the milk of women after childbirth	Dried seeds	Hot
Manzanilla	<i>Matricaria chamomilla</i>	Used against stomach ache before delivery	Flores	Hot
Marco	<i>Franseria artemisioides</i>	Used to relieve swollen legs during pregnancy. The leaves are used in baths to soothe the pain from haemorrhoids after delivery	Leaves	Cold
Matico	<i>Piperangistifolium</i>	Used against vaginal discharge	Leaves	Cold
Nabo-Aly Yuyu	<i>Brassica napus</i>	Used against pain in childbirth	Fruit	Cold
Oregano	<i>Origanum vulgare</i>	Used against stomach ache before delivery	Leaves	Hot
Paico- Paycu	<i>Chenopodium ambrosioides</i> L.	Used to stop the bleeding after childbirth	Leaves	Hot
Perenjol	<i>Petriselinum sativum</i>	Used against pain of the womb	Leaves	Cold
Pinpilina	<i>Petriselinum sativum</i>	Used to advance the delivery	Leaves	Cold
Romero	<i>Rosmarinus officinalis</i> L.	Used to speed up the delivery	Leaves and flowers	Hot
Ruda	<i>Ruta graveolens</i> L.	Used to alleviate discomfort caused by menstrual cramps	Branches and leaves	Hot
Sabila	<i>Aloe vera</i>	Used against vaginal discharge	Leaves	Cold
Sauco – Yana Sauco	<i>Cestrum racemolsum</i> R.	Used in postpartum infections	Leaves	Cold
Trinitraria	<i>Psoralea mutisii</i> H.	Used in postpartum infections	Bark, leaves and flowers	Hot
Uvilla	<i>Physalis peruviana</i> H.	Used to increase the milk of women after childbirth	Flowers and leaves	Hot
Valeriana – Guasilla	<i>Valeriana microphylla</i> H.	Used as purge after delivery	Root	Cold
Jana Yuyu	Unknown	Used against headache in pregnant women	Leaves	Cold
Zanahoria	<i>Daucus carota</i>	Used against postpartum anaemia	Root	Cold
Wawra Kimbo (Herba de infante)	Unknown	Used to relieve pain and swelling of the uterus	Leaves	Hot

presence of excessive heat or cold in the body. Therapies and the use of specific plants ('hot' or 'cold') are considered to be effective in re-establishing this balance.

In the case of the traditional midwives interviewed, they used a mixture of cool plants to bathe the mother and the newborn so that the balance of hot and cool was once more restored. One of the main plants included in this healing mixture were Chirimoya (*Anona chirimolia*), Paico (*Chenopodium ambrosioides* L.) and Trinitaria (*Psoralea mutisii* H.).

The largest number of reproduction-related medicinal plants used among the traditional midwives interviewed in the region of Otavalo was for postpartum recovery. Many of these same remedies were also used to treat menstrual haemorrhaging, menorrhagia, miscarriage.

The older traditional midwives were generally more knowledgeable regarding the plants that could be used in reproductive health. On average, they affirmed that they used around 50–60 medicinal plants. This form of ethnobotanical knowledge seemed to be less developed among the younger generations of traditional midwives, who affirmed using on average 30–40 medicinal plants.

Many of the remedies used for postpartum recovery were also employed to treat menorrhagia and menstrual haemorrhaging.

These were the most common reproductive health disorders the interviewees suffer. Almost 40% of those interviewed reported having experienced occasional or periodic menstrual haemorrhaging, which they described as a sudden, usually painless, heavy blood flow at a time other than their ordinary menstrual discharge. In the majority of the cases reported, herbal remedies were used to treat the haemorrhaging.

The majority of the 30 most cited species (see Table 1) were prepared by boiling in water, although a few were taken without prior cooking. The boiled plants were used for daily bathing and ingested for 2 days to several period. Raw plants were taken orally for several days. They were not used for bathing. Five or more separate ingredients were often mixed together, or taken at different times during the period of postpartum recovery. The length of time a woman used postpartum remedies varied according to the woman's pre-pregnancy state of health, the ease of the birth, etc. The roots, stems, bark, and branches of the plants were most commonly used, because these parts were considered the most fortifying and therapeutic.

A midwife in her late 50s affirms:

I use about 25–30 plants to treat pregnant women after the delivery...the most recurrent problems are lack of energy and occasional bleeding... I also use plants to relieve pain and swelling of the uterus and for other post-partum complaints...the dosage depends on the health condition of the woman after the delivery and on her diet...I normally use the leaves of the plants and boil them but in some cases flowers and bark can be used too...

A second large group of reproductive health remedies were employed to speed labour. Since one-third of the women interviewed, especially those living in the communities continue to give birth at home, such remedies were still fundamental to childbirth management in these communities. The use of medicinal plants to speed up the labour is consistent with the existing literature documenting the ethnobotanical and ethnopharmacological uses of plants used in reproductive health in Latin America (Gimpl and Fahrenholz, 2001; Ososki et al., 2002; Lee et al., 2009).

Coldness was regarded as the more serious postpartum problem. This was because the fetus is thought to deplete the woman's blood supply as gestation proceeds, leaving her especially vulnerable to assaults of cold.

The body condition of a pregnant woman is considered to be 'hot'; a situation that changes after labour, with the baby takes its mother's warmth with it (Garcia and Jimenez, 1986; Katz, 1997). After the delivery, women are considered to be more vulnerable to cold agents. As a consequence, cold symptoms usually seem to be related to gynaeco-obstetric ailments (Randall, 1993; Anderson, 2004). This logic of 'hot' and 'cold' substances provides an explanation for treatments aimed at rebuilding a woman's postpartum equilibrium with certain plants. Together with the administration of 'hot' plants, the midwives interviewed advised the use of warm baths and heat during puerperium, which is largely practised in other areas of Latin America (Katz, 1997; Lang and Elkin, 1997).

A woman in her late 20s explains:

After my first pregnancy, the midwife told me that I should have taken a hot bath to rebalance the temperature of my body. I was always feeling cold and without much energy... She gave me some plants with 'hot' properties and she told me that I should boil them and then take a bath in that water for about twenty minutes every day for ten days after the delivery... I did what she told me to do and gradually I felt better...

Medicinal plants used to speed the birthing process were usually taken towards the end of gestation period or at the onset of labour pains. Plants that produce uterine contractions have similar action as that of oxytocin hormone, produced by the posterior lobule of the hypothalamus, which stimulates the uterus to have strong contractions, thus producing labour (Gimpl and Fahrenholz, 2001; Lee et al., 2009).

Traditional midwives and pharmacological cross-cultural practices

In general, the *parteras* were not comfortable in using allopathic drugs for reproductive health and they affirmed not being qualified to do this. Two-thirds of them were aware of the presence of side effects that may develop from the use of these drugs on patients with specific pathologies.

Two-thirds of the older *parteras* (more than 60 years old) interviewed did not know the allopathic medicines that could be given to women during or after the labour. Some of them knew that chemical medicines such as antibiotics could be prescribed in case of infection after childbirth but did not know what the name of these medicines. These older *parteras*, especially those coming from the rural area, expressed little interest in learning the use of allopathic medicines for reproductive health. These *parteras* declared that they did not know of any chemical drug that might have helped to restore this balance between the different substances and they were thus praising medicinal plants such as ruda (*Ruta graveolens* L.) and Trinitaria (*P. mutisii* H.) that are believed to allow the body to regain its balance.

Another important point to emphasise is that some *parteras* thought that there was not an equivalent among the chemical drugs for the therapeutic functions owned by some medicinal plants. According to them, there were plants, such as the plant Wawra Kimbo (*Herba de infante*), which combined with a massage could put the baby in a good position in the womb if the position of the fetus was horizontal. These traditional midwives proudly affirmed that there 'there is no chemical drug that can have this effect'.

Another important point raised by the *parteras* regarding the efficacy between plants and allopathic drugs was that here are some plants that were very important in terms of rituals after delivery or before delivery to allow the delivery and the postpartum to go well. A midwife in her late 60s explained:

When a woman suffers from emotional problems such as stress and anxiety as she is approaching the time of the

delivery, it is very important that she takes some decoctions that have the power to strengthen her emotionally and physically and to attract good luck so that the delivery will go well... these plants are very important as they harmonize the energy of the body...

Among the plants that were used to prepare these decoctions were the red carnation (*Dianthus caryophyllus*), toronjil (*Melissa officinalis*) and a local plant called *Kuy shunky kiwa*.

Other plants that were perceived as plants having an important value for ritual uses by the *parteras* were the arrayán (*Luma apiculata*), nogal (*Juglans nigra* L.) and laurel (*Cordia alliodora*). These plants were normally used to give a ritual bath to the women who had their babies a week after their delivery. These plants were attributed important functions both for the body and the psyche as they were believed they could reinforce both the physical and the emotional spheres of the women and defend them from 'evil eye'. It is believed that 'evil eye' can affect children and newborn babies. The latter, being weaker than adults are unable to oppose themselves to powerful evil energies. 'Evil eye' is folk disease that is quite well-known in the culture of Ecuador (Disderi, 2001) as well as in Latin America's popular health beliefs (Pieroni and Price, 2006).

Cosminsky (2001) highlights that the interpretation of the norms and beliefs pertaining to maternal–baby care and childbirth can be ascribed not only in a biological process but also in a more complex socio-cultural process. Literature shows that a large part of the indigenous population in Latin America shares cultural representations and therapeutic beliefs associated with traditional medicine, trusting both the biological and symbolical efficacy of these practices (Giovannini and Heinrich, 2009).

It is important here to note how the therapeutic use of plants is often considered to be one of the most important functions of medicinal plants. Nevertheless, the analysis of the cultural context in which these plants are used among the indigenous *parteras* in Ecuador shows that there are some plants having a comprehensive and holistic role. As already emphasised, the healing properties of the plants are never dissociated from their symbolic values. This is reflected in the multiple roles of the plants in terms of their different therapeutic and ritual aspects.

There were also some plants that according to the *parteras* were able to take care of some specific reproductive health problems of indigenous people that cannot be found among *mestizo* and for which there was no allopathic cure. This in particular consists in the displacement of a woman's uterus or prolapse of the uterus (*caída de matriz*). Organ displacement is a relatively common condition among people of Latin America (Waldstein and Adams, 2006) which is believed to be caused by a general imbalance in the body. It is the actual displacement that contributes to the person's loss of bodily equilibrium. In this illness category particular organs or parts of the body shift from their original position and cause problems to the person's health. In the case of uterine displacement, this usually takes place when a woman has been carrying heavy loads, has fallen or received a strong bump, or has had some sort of strong temperature imbalance.

This illness has to be treated according to *parteras* by restoring balance to the woman's body. This can be achieved through *sobadas* (massages) of the lower abdomen where a midwife slowly massages the uterus back into place. Medicinal plants are integral to helping a woman treat her *caída de matriz*. For instance, *Mentzelia aspera* L. is made into a tea, which the woman must drink as long as her condition exists. This plant is known for sticking to people's skin and clothes because of its prickly surface, a property that is believed will help the uterus attach itself with greater strength to its proper position. The phenomenon of *caída de matriz* represents a clear example of a culture-bound syndrome. It shows that a disease is a socially and

culturally negotiated phenomenon. Culture-bound syndromes have been discussed under a variety of names by anthropologists (Simons and Hughes, 1985; Landy, 1977) and have sometimes been included in discussions of cultural psychiatry (Kleinman, 1991).

Conversely, the interviews showed that the younger *parteras*, especially those who have collaborated with the hospital Sal Luis in Otavalo and that have interacted with the doctors and nurses, had a different vision vis-à-vis chemical medicines, and saw them as useful to treat gynaecological and reproductive problems. A midwife in her mid-forties affirmed:

it is very interesting to see how the chemical medicines are used at the hospital... there are very useful medicines to ease childbirth, reduce pain and to reduce postpartum hemorrhages... these drugs are effective and I'd like to use them in my profession as a midwife... I generally use plants... these plants are quite effective, especially those that I use for the pain during the labor and to facilitate the expulsion of the child but the plants are not always effective for all the patients.. Also it is necessary sometimes to wait long before the medicinal plants become effective.. the chemical medicines solve the problem much faster...

Besides the fact that chemical drugs seemed to be according by some *parteras* faster in alleviating the labour pain, another aspect emphasised by the younger *parteras* was that medicinal plants to be effective in relieving the pain should have been matched with massages and hot baths. As one *partera* from Otavalo emphasised

It would be much easier for us to give a chemical drug to the women instead of giving them medicinal plants.. For example, when you have to relieve the pain in women during the labor, you need to massage them for a long time.. this is quite tiring... giving the herbal infusion to women is not enough.. I think sometimes it would be more practical just to use a western medication...

Another aspect emphasised by some *parteras* was that there are some medicinal plants, such as Chirimoya (*A. chirimolia*) and Guarango (*Caesalpinia spinosa*), whose availability is seasonal. This made it difficult to use them throughout the year. It would be more practical to use medical drugs.

This perception regarding chemical medicines from the hospital in Otavalo, who worked for the promotion of intercultural and reproductive health project, is interesting. The main objective of this project was to strengthen the traditional knowledge of the parties in order to allow them to gain more recognition at an institutional level and provide a better service tailored to the cultural needs of indigenous women. This project also included the creation of an herbal garden near the hospital for the cultivation of medicinal plants used for reproductive health by the *parteras*. The interviews with the *parteras* working at the hospital showed that there was a process of exchange of knowledge especially with the nurses between the indigenous medicine and Western Europe. The *parteras* stated that some nurses were interested in learning the use of native plants and massage, and the traditional midwives were rather interested in learning more on the uses of chemical medicines. This was also confirmed by interviews with the nurses at the Hospital of Otavalo, who declared their interest in learning more about the medicinal plants used by the *parteras*.

Nevertheless, when asked what were the plants that were used by the *parteras*, just one nurse was able to name these plants and their preparation, being the other nurses unable to list these plants.

Even though these medicinal species are highly relevant in the traditional care of women, data show that they are still of minor importance in the biomedical context. As the interviews highlighted, health professionals have a common lack of familiarity with the identification of medicinal plants and the necessary doses of plants. This situation might change with the introduction of training courses on the subject, specifically targeted to health professionals. Once health-care professionals become educated on this topic, they could become more receptive towards the use of medicinal plants and the incorporation of some traditional practices.

Interviews with the younger *parteras* living in urban Otavalo highlighted that there the perceptions on medicinal plants and their uses for reproductive health changed in time. For instance, one-third of the *parteras*, in particular the younger ones (i.e., between 40 and 45 years old) affirmed that they had the habit to combine at the same time drugs and medicinal plants, such as for example some antibiotics for infections of urinary tract or drugs to reduce the bleeding after the delivery.

This practice shows how the medicinal systems, i.e., indigenous system and Western system, are not separated. On the contrary intercultural health practices, where the knowledge and the epistemologies of these different systems are combined, are well present in the therapeutic scenario in Ecuador. An individual's decision to use available pharmaceutical resources to alleviate discomfort, prevent illness is influenced by myriad factors. These factors range among the others from cultural sensitivities and preferences for specific forms of medicine to the perceptions of risks and health advantages of a given treatment (Andrews et al., 2004).

Having said that, it is also important to emphasise how the combination of chemical and natural pharmacopeia is something quite delicate, especially if the patients are pregnant women and women who have recently given birth. It is evident from this research that *parteras'* awareness of interactions between herbal medicine and conventional medicine is lacking and this has the potential to cause serious interactions. Drug interaction is defined as any modification caused by another exogenous chemical (drug, herb or food) in the diagnostic, therapeutic or other action of a drug in or on the body (Koh and Woo, 2000; Sparreboom et al., 2004). Doctors in many cases do not possess the knowledge to assess the side effects of the combination of these drugs so they are unable to effectively advise their patients. Further studies should be carried out in order to evaluate the extent to which remedies, such as those used by traditional *parteras* are safe and effective and how they could possibly interact with allopathic treatment.

It is of paramount importance, therefore, that awareness is raised among both the public and health-care professionals that herbal and allopathic medicines can interact. Safety and relationships with their patients are likely to be better maintained if doctors are willing to enter into non-judgmental dialogues with patients about herbal medicines, take on board why herbal medicine is meaningful to them, and allow their patients to maintain personal control in decisions about treatment options.

Ethnopharmacological studies have been undertaken for some native species in Ecuador, and there is also a vademecum for authorised useful species; however, no studies confirming the medical value or potential danger of most of the species described for female ailments in this study have been carried out, especially for native species. Similar or identical uses have been described for imported cultured species such as *Ruta chalepensis*, *Tanacetum parthenium*, *Petroselinum crispum* and *Artemisia absinthium* (Ososki et al., 2002).

In order to develop medical pluralism, there is a need for a thorough analysis on the possible dangers and benefits associated with the different traditional therapeutic practices; a situation that has still not been put into practice. The ethnobotanical and

ethnopharmacological dimensions of medicinal plants used by traditional midwives are not even considered in the training of biomedical professionals in Otavalo.

In some cases, traditional midwives, especially those who lived in the city of Otavalo and those who worked at the San Luis Hospital in Otavalo in the Intercultural Health Project, expressed a preference for allopathic treatment instead of medicinal plants. For instance, a traditional midwife affirmed that she used in some cases a medication such as whose labours were oxytocin to accelerate the contractions of the parturient and the allopathic drug Pitocin to reduce the pain during the delivery. It is important to notice here the erroneous use of Pitocin of pain reliever by traditional midwives. Pitocin is a synthetic form of oxytocin, the natural hormone that stimulates the onset of labour and does not represent a drug to reduce pain in labouring women. The use of Pitocin by traditional midwives represents a delicate issue as this drug can entail serious side effects on patients. The access to this medication should be solely prescribed by doctors and strictly monitored by health professionals.

Ergonovine, an allopathic drug, was also used in women to stop excessive bleeding after childbirth or after an abortion or miscarriage.

When asked why she preferred using a drug instead of a plant, the midwife emphasised that the results of the drug were quicker than the plant. As a consequence, the woman had a less difficult birthing experience and she did not need to spend many hours in the delivery process.

The increase of medicalization of birth, even among traditional midwives through the use of allopathic treatment during the delivery was confirmed by the patients interviewed. Almost the majority of them (i.e., 28 of 35), especially the younger ones and those living in the urban area of Otavalo, declared that they asked or would ask their *partera* the medication to accelerate the contractions in order to give birth more quickly. They declared that medicinal plants were not as effective and fast as the allopathic medication. One 28 years old woman affirmed:

I explicitly asked the partera to inject me with... I did not use Pitocin before but my sister was injected with ... at the hospital and she was able to deliver her baby very fast... she did not suffer much as my other sister who just drank the herbal remedies of the parteras... That's why I want to be injected as well...

Although all the *parteras* interviewed, except one, denied using this kind of medications during the delivery, concerns still remain on the possible health consequences of a misuse of this drug on pregnant women. Indeed, serious side effects such as the rupture of the uterus could happen if the doses of this medication are exceeded and if particular patients, for instance those suffering from high blood pressure, take it. The access of these medications should be closely monitored and strictly allowed to health professionals.

Oxytocin should not be used to induce labour when there is evidence of fetal distress, abnormal fetal position, placenta previa, uterine prolapse, cephalopelvic disproportion, cervical cancer, major surgery or uterine neck or previous herpes infection. The use of oxytocin in these cases may cause a worsening of the condition causing unnecessary suffering to the fetus and the mother (Lee et al., 2009). Some patients may experience a hypersensitivity reaction uterine oxytocin. The same occurs with excessive doses, resulting in bigger hypertonic contractions that can cause cervical laceration, postpartum haemorrhage, pelvic haematoma and rupture of the uterus. In some patients with hypersensitivity to oxytocin can cause severe anaphylactic shock (personal communication with nurse, hospital of Otavalo, May 2011).

Beliefs and perceptions of patients about cross-cultural pharmacological practices

The women interviewed, especially those who had an indigenous background and were coming from the rural areas, showed interest towards medicinal plants for reproductive health. The plants that they used were Sauco (*Cestrum racemolsum* R.), Uvilla (*Physalis peruviana* H.) and Congona (*Peperonia congona*), respectively used by the 45%, 32% and 27% of the interviewees. The plants that were most commonly used were those to alleviate labour pain, those to speed up the delivery and those to reduce the bleeding after the delivery.

The data show that age and education, in addition to ethnic and geographic background, represented an important factor that influenced the use and perception of medicinal plants among the interviewees. In particular, younger and educated women were less interested in using medicinal plants for their reproductive health and were relying more on chemical drugs. Despite this, a small group of the women (i.e., 8) that had a higher education and came from the city of Otavalo affirmed that it was preferable to take medicinal plants instead of chemical drugs as chemical drugs can interfere with the natural metabolism of the body, especially during pregnancy and would have had a negative consequence on the quality of their milk and their capacity to breast feed. Although the use of medications such as oxytocin does not require a long period of abstention from breast feeding, there was a shared perception among these women that the previous consumption of chemical drugs is particularly pernicious for the babies.

Motives for herbal medicine use among these interviewees were centred essentially on the contrasting advantages of herbal medicine and disadvantages of conventional medicine. The main factors mentioned were concerns about side effects and belief that herbal medicine is natural and free from chemicals and thus safe. Similar findings arose in studies into CAM therapies in general where the belief they are 'natural' appears to be synonymous with 'safe' (Cuzzolin et al., 2003). This suggests that awareness needs to be raised that herbal medicines may contain powerful and potentially toxic ingredients and therefore, need to be treated by users in the same way as conventional medicines.

Interviews with the younger patients (age between 22 and 35 years old), especially those who did not belong to indigenous communities, highlighted that they would prefer chemical drugs. The preference for chemical drugs was higher for more complicated gynaecological problems such as postpartum infections, prolonged labour pain and severe haemorrhages. According to these women, medicinal plants were useful to cope with minor reproductive health issues.

According to van der Geest and Whyte, medicines, defined as 'substances used in treating illness,' are 'charms' that act as important vehicles for imparting and communicating social messages (1989:345). Arguing that the worldwide popularity of medicines is not justified solely by their effectiveness, the authors use the concept of fetishism to contend that medicines are objects that facilitate 'symbolic processes' (van der Geest and Reynolds Whyte, 1989:345). Medicines are meant to heal so that the transfer of a medicine from one hand to another symbolically implies the transfer of healing powers as well. Pharmaceuticals carry with them potent associations of a powerful healing tradition that encompasses doctors, laboratories, and science, in other words 'the power and potential of advanced technology' (van der Geest and Reynolds Whyte, 1989:361).

The majority of women did not feel safe taking chemical drugs from *parteras* but they affirmed that they would have taken them only if a doctor had given them. More than two-thirds of the interviewees (i.e., 26) were generally aware of the possible risks

of taking these drugs and considered that the supervision of a doctor was an important factor while taking the drugs. Only a minority of the women interviewed, especially those who were coming from the rural areas and were uneducated, did not seem to be aware of the serious risks of taking drugs, especially those to speed up the labour.

Conclusion

Despite the antiquity of the practice of midwifery, much remains to be learned about the relationships between the use and knowledge of medicinal plants by traditional midwives and maternal–infant health care provides, especially in terms of evolution of these practices in the urban context.

This study has described some of the cultural practices and perceptions that shape the use of medicinal plants for reproductive health among indigenous midwives and patients in Ecuador. Data show that specific plants are chosen for particular health conditions based on the understandings of the traditional midwives on reproductive physiology and the processes of conception, gestation, parturition, and postpartum recovery.

The use of medicinal plants by traditional birth attendants in inducing contractions during labour shows the fact that some plants may guide the discovery of new oxytocics. Further field and laboratory research are necessary in order to understand the appropriate dosage levels, the toxicity and efficacy of these herbal remedies. Scientific research that can direct health policies in designing effective reproductive health care, as well as in creating collaborative approaches involving traditional medical practitioners such as traditional birth attendants, would be necessary.

Programs encouraging indigenous groups to re-evaluate their traditions and beliefs could be a step towards medical pluralism, where modern medicine is available, but local ideas are not lost and remain important in people's daily lives.

The study also emphasises that the *parteras*, despite continuing to have a strong reliance on a large number of medicinal plants, have been combined with allopathic treatment. This is especially the case for those traditional midwives that live in urban areas and that have been exposed to Western medicine by collaborating at the San Luis Hospital.

Specific studies should be carried out in order to scientifically assess the therapeutic values of these plants used in reproductive health. Further research using scientifically controlled procedures is, therefore, urgently needed to evaluate the extent to which remedies such as these are safe and effective. It is also important to shed light on how traditional medicine and allopathic treatment are interacting with each other and the possible emergence of side effects. This is especially urgent for treatment that is given to women in a delicate phase of their life such as pregnancy and postpartum period.

References

- Albuquerque, U.P., de Oliveira, R.F., 2007. Is the use-impact on native caatinga species in Brazil reduced by the high species richness of medicinal plants? *Journal of Ethnopharmacology* 1 (3), 156–170.
- Anderson, B.A., 2004. Pathways of decision making among Yucatan Mayan traditional birth attendants. *Journal of Midwifery and Women's Health* 4 (9), 312–319.
- Andrews, G., Wiles, G., Miller, K., 2004. The geography of complementary medicine: perspectives and prospects. *Complementary Therapies in Nursing and Midwifery* 10 (3), 175–185.
- Baer, H.A., 2005. Trends in religious healing and the integration of biomedicine and complementary and alternative medicine in the United States and around the globe: a review. *Medical Anthropology Quarterly* 19 (4), 437–442.
- Bailey, P., de Bocalletti, E., Barrios, G., de Cross, Y., 2005. Monitoring utilization and need for obstetric care in the Highlands of Guatemala. *International Journal of Gynecology and Obstetrics* 8 (9), 209–217.

- Bailey, P., Szaszdi, J., Glover, L., 2002. Obstetric complications: does training traditional birth attendants make a difference? *Pan American Journal of Public Health* 1 (1), 15–23.
- Béjar, E., Bussmann, R.W., Roa, C., Sharon, D., 2001. Herbs of Southern Ecuador—Hierbas del Sur Ecuatoriano. Latin Herbal Press, San Diego.
- Brown, P., 2008. Perspectives in Medical Sociology. Waveland Press, Long Grove, IL.
- Bussmann, R., Sharon, D., 2006. Traditional medicinal plant use in Loja province, Southern Ecuador. *Journal of Ethnobiology and Ethnomedicine* 2 (44), 1–11.
- Calvet-Mir, L., Reyes-García, V., Tanner, S., 2008. Is there a divide between local knowledge and western medicine? A case study among native Amazonians in Bolivia. *Journal of Ethnobiology and Ethnomedicine* 18 (4), 18–32.
- Capuccio, F.P., Dunecleft, S.M., Atkinson, R.W., Cook, D.G., 2001. Alternative medicines in a multi-ethnic population. *Ethnicity and Disease* 1 (1), 11–18.
- Cavender, A., Albán, M., 2009. The use of magical plants by curanderos in the Ecuador highlands. *Journal of Ethnobiology and Ethnomedicine* 5 (3), 1–9.
- Cosminsky, S., 2001. Maya midwives of Southern Mexico and Guatemala. In: Brad, R., Huber, Sandstrom, Alan R. (Eds.), *In Mesoamerican Healers*. University of Texas Press, Austin, TX, pp. 179–210.
- Cuerrero, A., Arnason, J.T., 2008. Ethnobotany in Canada: where biological and cultural diversity meet. *Botany* 86 (7), 234–246.
- Cuzzolin, L., Zaffani, S., Murgia, V., et al., 2003. Patterns and perceptions of complementary/alternative medicine among paediatricians and patients' mothers: a review of the literature. *European Journal of Pediatrics* 1 (2), 820–837.
- Davis-Floyd, Robbie, E., 2001. La Partera Profesional: Articulating Identity and Cultural Space for a New Kind of Midwife in Mexico. In: Davis-Floyd, R., Cosminsky, S., Pigg, Stacy L. (Eds.), *Daughters of Time: The Shifting Identities of Contemporary Midwives*, a special issue of *Medical Anthropology*, 20; 2001, pp. 185–244.
- Davis-Floyd, R., 2003. Home-birth emergencies in the US and Mexico: the trouble with transport. *Social Science & Medicine* 5 (6), 1911–1931.
- DeVries, R., 2004. A Pleasing Birth: Midwives and Maternity Care in the Netherlands. Temple University Press, Philadelphia.
- Disderi, I., 2001. The 'evil eye' (ojeo) cure: ritual and therapy of the peasant's representations in central and western Santa Fe. *Mitologías* 1 (6), 135–151.
- Ellen, R., 1996. Putting plants in their place: anthropological approaches to understanding the ethnobotanical knowledge of rainforest populations. In: Edwards, D.S., Booth, W., Choy, S. (Eds.), *In Tropical Rainforest Research: Current Issues*. Kluwer Academic Publishers, Dordrecht, pp. 457–465.
- Etkin, N.L., Elisabetsky, E., 2005. Seeking a transdisciplinary and culturally germane science: the future of ethnopharmacology. *Journal of Ethnopharmacology* 1 (2), 23–26.
- Etkin, N.L., 1988. Ethnopharmacology—biobehavioral approaches in the anthropological study of indigenous medicines. *Annual Review of Anthropology* 1 (7), 23–42.
- Finnerman, R., Sackett, R., 2003. Using home gardens to decipher health and healing in the Andes. *Medical Anthropology Quarterly* 1 (7), 459–482.
- Foster, J., Anderson, A., Houston, J., Doe-Simkins, M., 2004. A midwifery model for training traditional midwives in Guatemala: a report from the field. *Midwifery* 20 (3), 217–225.
- García, S., Jiménez, D., 1986. Natural and artificial: cold and hot. Classification systems that are still in force among the "criollos" of Argentina. *Suplemento Antropológico* 1 (2), 131–146.
- Geurts, K., 2001. Childbirth and pragmatic midwifery in Rural Ghana. In: Davis-Floyd, Robbie, Cosminsky, Sheila, Pigg, Stacy L. (Eds.), *Daughters of Time: The Shifting Identities of Contemporary Midwives*, a special issue of *Medical Anthropology*, 20; 2001, pp. 45–52.
- Gimpl, G., Fahrenholz, F., 2001. The oxytocin receptor system: structure, function, and regulation. *Physiological Review* 8 (2), 629–683.
- Giovannini, P., Heinrich, M., 2009. Xki yoma' (our medicine) and xki tienda (patent medicine)—interface between traditional and modern medicine among the Mazatecos of Oaxaca, Mexico. *Journal of Ethnopharmacology* 1 (1), 383–399.
- Green, G., Bradby, H., Chan, A., Lee, M., 2006. "We are not completely Westernised": dualmedical systems and pathways to health care among Chinese migrant women in England. *Social Science and Medicine* 6 (2), 1498–1507.
- Gollin, L., 2004. Subtle and profound sensory attributes of medicinal plants among the Kenyah leppo' ke of east Kalimantan, Borneo. *Journal of Ethnobiology* 2 (4), 173–201.
- Hamilton, A.C., 2004. Medicinal plants, conservation and livelihoods. *Biodiversity and Conservation* 13 (5), 1477–1517.
- Helman, C.G., 2007. Culture, Health and Illness. Hodder Arnold, London.
- Hilgert, N.I., 2001. Plants used in home medicine in the Zenta River basin, Northwest Argentina. *Journal of Ethnopharmacology* 7 (6), 11–34.
- Hobson, H., 2006. Sexual magic and money: Miskitu women's strategies in Northern Honduras. *Ethnology* 45 (2), 143–159.
- Idoyaga Molina, A., 2000. The quality of health services and the point of view of the user in a multiple medical context. *Scripta Ethnologica* 16 (2), 21–85.
- Janni, K.D., Bastien, J.W., 2004. Special section on medicinal plants—exotic botanicals in the Kallaway Pharmacopoeia. *Economic Botany* 58 (2), 274–282.
- Katz, E., 1997. Therapeutic baths and postpartum among the indigenous people of Mixteca Alta (Mexico). *Parodianna* 10 (2), 153–164.
- Kisangau, D.P., Lyaruu, H.V.M., Hosea, K.M., Cosam, C.J., 2007. Use of traditional medicines in the management of HIV/AIDS opportunistic infections in Tanzania: a case in the Bukoba rural district. *Journal of Ethnobiology and Ethnomedicine* 3 (29), 123–134.
- Kirmayer, L., 2004. The cultural diversity of healing: meaning, metaphor and mechanism. *British Medical Bulletin* 6 (9), 33–48.
- Kleinman, A., 1991. Rethinking Psychiatry: From Cultural Category to Personal Experience. Free Press, New York.
- Koh, H.-L., Woo, S.-O., 2000. Chinese proprietary medicine in Singapore: regulatory control of toxic heavy metals and undeclared drugs. *Drug Safety* 23 (5), 351–362.
- Landy, D., 1977. Culture, Disease, and Healing: Studies in Medical Anthropology. Macmillan, New York.
- Lang, J.B., Elkin, E.D., 1997. A study of the beliefs and birthing practices of traditional midwives in rural Guatemala. *Journal of Nurse-Midwifery* 4 (2), 25–31.
- Langwick, S.A., 2008. Articulate(d) bodies: traditional medicine in a Tanzanian Hospital. *American Ethnologist* 35 (3), 428–439.
- Lee, H.J., Macbeth, A.H., Pagani, J.H., Young, W.S., 2009. Oxytocin: the great facilitator of life. *Progress in Neurobiology* 88 (2), 127–151.
- McNeely, J.A., 2005. Biological and cultural diversity: the double helix of sustainable development. In: Arnason, J.T., Catling, P.M., Small, E., Dang, P.T., Lambert, J.D.H. (Eds.), *Biodiversity and Health: Focusing Research to Policy*. NRC Press, Ottawa, pp. 3–9.
- Nettleton, C., Stephens, C., Bristow, F., et al., 2007. Utz Wachil: findings from an international study of indigenous perspectives on health and environment. *EcoHealth* 4 (2), 461–471.
- Nigenda, G., Ruiz, J.A., Bejerano, R., 2005. University-trained nurses in Mexico: an assessment of educational attrition and labour wastage. *Salud Publica de Mexico* 48 (1), 22–29.
- Pardo De Santayana, M., Blanco, E., Morales, R., 2005. Plants known as te' in Spain: an ethno-pharmaco-botanical review. *Journal of Ethnopharmacology* 9 (8), 1–19.
- Ososki, A.L., Lohr, P., Reiff, M., et al., 2002. Ethnobotanical literature survey of medicinal plants in the Dominican Republic used for women's health conditions. *Journal of Ethnopharmacology* 7 (9), 285–298.
- Pesek, T., Abramuk, M., Garagic, D., Fini, N., Meerman, J., Cal, V., 2009. Sustaining plants and people: traditional Q'eqchi Maya botanical knowledge and interactive spatial modeling in prioritizing conservation of medicinal plants for culturally relative holistic health promotion. *EcoHealth* 6 (3), 1–12.
- Pieroni, A., Muenz, H., Akbulut, M., Baser, K.H.C., Durmuskahya, C., 2005. Traditional phytotherapy and trans-cultural pharmacy among Turkish migrants living in Cologne, Germany. *Journal of Ethnopharmacology* 1 (2), 69–88.
- Pieroni, A., Price, L., 2006. Eating and Healing. Traditional Foods as Medicine. The Haworth Press, New York.
- Pieroni, A., Quave, C., Villanelli, M., et al., 2004. Ethnopharmacognostic survey on the natural ingredients used in folk cosmetics, cosmeceuticals and remedies for healing skin diseases in the inland Marches, Central-Eastern Italy. *Journal of Ethnopharmacology* 9 (1), 331–344.
- Randall, S.C., 1993. Blood is hotter than water: popular use of hot and cold in Kel Tamasheq illness management. *Social Science & Medicine* 3 (6), 673–681.
- Sandhu, D.S., Heinrich, M., 2005. The use of health foods, spices and other botanicals in the Sikh community in London. *Phytotherapy Research* 1 (9), 633–642.
- Scarpa, G.F., 2004. Medicinal plants used by the Criollos of Northwest Argentine Chaco. *Journal of Ethnopharmacology* 9 (1), 115–135.
- Shepard, G.H., 2004. A sensory ecology of medicinal plant therapy in two Amazonian societies. *American Anthropologist* 1 (6), 252–266.
- Sibley, L.M., Sipe, T., 2002. Traditional birth attendant training effectiveness: a meta-analysis. Technical Report given to Agency for International Development, September 2002.
- Simons, R., Hughes, 1985. The Culture-Bound Syndromes: Folk Illnesses and Anthropological Interest. D. Reidel Publishing Co., Dordrecht, Holland.
- Sparre, G., Harling, B., 2006. Flora of Ecuador, Council for Nordic Publications in Botany. Quito.
- Sparreboom, A., Cox, M., Acharya, M., William, D., 2004. Herbal remedies in the United States: potential adverse interactions with anticancer agents. *Journal of Clinical Oncology* 22 (12), 2489–2503.
- Thomas, E., Vandebroek, I., Sanca, S., Van Damme, P., 2009. Cultural significance of medicinal plant families and species among Quechua farmers in Apillapampa, Bolivia. *Journal of Ethnopharmacology* 1 (2), 60–67.
- Torres, J.M., DeVries, R., 2009. Birthing ethics: what mothers, families, childbirth educators, nurses, and physicians should know about the ethics of childbirth. *Journal of Perinatal Education* 18 (1), 2–24.
- Vandebroek, I., Calewaert, J., De jonckheere, S., et al., 2004. Use of medicinal plants and pharmaceuticals by indigenous communities in the Bolivian Andes and Amazon. *Bulletin of the World Health Organization* 8 (4), 243–250.
- van der Geest, S., Reynolds Whyte, S., 1989. The charm of medicines: metaphors and metonyms. *Medical Anthropology Quarterly* 3 (4), 345–367.
- Waldstein, A., Adams, C., 2006. The interface between medical anthropology and medical ethnobiology. *Journal of the Royal Anthropological Institute* 1 (2), 95–118.
- Walsh, D., Downe, S.M., 2004. Outcomes of free-standing, midwife led birth centres: a structured review. *Birth* 31 (3), 222–229.
- Whitaker, E.D., 2003. The idea of health: history, medical pluralism, and the management of the body in Emilia-Romagna, Italy. *Medical Anthropology Quarterly* 17 (3), 348–375.
- Wiley, A.S., 2008. Medical Anthropology: A Biocultural Approach. University of Southern California.