Abstract

In this paper the uses of indigenous plants for nutritive and medicinal care of neonates and pregnant and post-partum Mahafaly women in Southwest Madagascar are described and discussed. Following a global comparison of cultural practices associated with their use, I contend that ethnographers have missed many uses of plants because they have focused on illness and healing, thus overlooking routine and nutritive care. Moreover, botanists who exclusively survey plants used by healers, may also miss relevant information on their knowledge and use by the lay population. Consequently, ethnographers who focus specifically on pregnancy and child care and investigate the use of non-cultivated plants by local residents may discover valuable uses of indigenous plants. I conclude that the pharmacological properties of many of these plants are not yet known; further research on plant species, particularly in Southern Madagascar, is therefore suggested.

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Routine Herbal Treatment for Pregnant Women, Neonates, and Postpartum Care Among the Mahafaly of Southwest Madagascar

by

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ROUTINE HERBAL TREATMENT FOR PREGNANT WOMEN, NEONATES, AND POSTPARTUM CARE AMONG THE MAHAFALY OF SOUTHWEST MADAGASCAR

Introduction

Some aspects of traditional care of neonates and pregnant and postpartum women among the Mahafaly of southwestern Madagascar are discussed in this paper. These data were collected form 1987 to 1988 during a ten-month field study of Mahafaly medical beliefs and practices in relation to social organization and religion.

The Region

The Mahafaly region in southwest Madagascar extends for about 200 km along the coast (from the Onilahy River in the north to the Menarandra River in the south) and reaches approximately 150 km inland, covering an area of about 43,000 square kilometers. This is one of the most arid regions of Madagascar and the lack of water is the greatest problem facing the Mahafaly. Annual rainfall is below 400 mm and there may not be precipitation for twelve to eighteen months. The vegetation includes deciduous riverine forest, dense brush and scrub, grassland, succulent *Euphorbia*, and endemic, xerophytic Didiereaceae forests.

The population density of the region is low and averages seven individuals per square kilometer. Individuals identified in the 1972 census as Mahafaly are the most numerous in the area (121,000) and comprise approximately one-third of the total population. Other groups of significant size are the Sakalava, Antanosy, and Antandroy.

The Mahafaly are mixed pastoralists; they engaged in both cattle herding and subsistence agriculture. In some parts of the region, particularly on the coastal plain, transhumance is practiced, while in others, herds are moved to distant pastures only in times of drought (Battistini 1964). Subsistence crops include manioc, sweet potatoes, maize, and beans.

The Research Site

The study was conducted in a village 40 km northeast of the town of Betioky, and 200 km from the city of Tulear. It was chosen as the research site because it neighbors the Beza-Mahafaly natural reserve which was established in 1978 in a cooperative agreement between the University of Madagascar, Washington University, and Yale University. No systematic ethnographic research or research on the traditional use of forest resources, however, has been conducted there nor on the Mahafaly elsewhere.

The village consists of eight hamlets (possessing a common village president) dispersed over an area of approximately three and one-half square kilometers. The total population of the eight hamlets was 484 individuals in 133 households of which 49 percent were under the age of 18 and approximately eight percent over the age of 60, at the time of the research.

All of the residents are agriculturalists and subsist on and cultivate manioc, corn, sweet potatoes, and beans. Onions are the major cash crop. Most families also herd cattle, goats, and sheep. The majority of the population is illiterate and few of the children attended school (there was an elementary school approximately five kilometers from the village).

The major means of transportation are walking and ox carts. The roads are generally in poor condition and turn to mud during the rainy season making travel by car difficult, if not impossible. The closest town with market, medicine vendor, and dispensary is a three-hour walk, (Beavoha), the next closest town (Betioky) (with a slightly better stocked government hospital and dispensary) is an eight-hour walk or six-hour oxcart ride away. A Catholic missionary hospital, staffed by French doctors, is located 27 kilometers away, across a large river (Onilahy), and is approximately eight hours away by foot and pirogue. This location, however, is inaccessible during most of the rainy season (December to March) and the hospital in Betioky is occasionally inaccessible even by foot and oxcart because the Sakamena River just south of the village rises. Tulear, the major city in the region, is a four- to six-hour drive in a four-wheel drive vehicle, depending upon the condition of the road.

In short, biomedical care is relatively inaccessible and the residents are heavily dependent upon traditional medicine in times of illness. In the village itself, there are at least ten healers, specializing in a variety of illnesses and ailments, including dental problems, fractures, and sprains. Some treat "natural" illnesses (with herbal remedies) exclusively, while others specialize in illnesses resulting from sorcery or spirit possession and utilize a combination of ritual and herbal treatment.

There are no midwives in the area; routine care during pregnancy, childbirth, and the postpartum period is the responsibility of the family. Final decisions regarding the care of women and infants are made by the husband and, sometimes, by the woman's father.

General Medical Beliefs and Practices

The Mahafaly believe that illness may be caused by a variety of factors including displeasure of the ancestors, sorcery, and spirit possession (*jinn, douany, bilo*) (see Table 1). "Natural" causes are also believed to cause illness. Such illnesses are referred to as *arety Zanahary* (or illnesses of God--the same term is used in Mauritius and many parts of Africa) (see for example, Janzen 1981; Sussman 1981, 1983; Yoder 1981). There is, however, considerable individual variation in the way in which this term is interpreted. Some people

believe that Zanahary (God) makes people ill, while others believe that He creates all illnesses and that people catch them somewhat randomly.

Each cause requires a different form of treatment; some require ritual treatment while others require herbal treatment or a mixture of both, still others are responsive to either herbal or biomedical treatment. Divination with seeds of *Entada abyssinica* is the most frequently used means of determining the cause of illness with any certainty. Divination may be performed by male villagers themselves, by healers or by diviners. Spirit-mediums may also diagnose the cause of illness; there was, however, disagreement among informants about whether they could diagnose causes other than the type of spirit possessing them.

The Mahafaly possess a large body of knowledge concerning the medicinal uses of plants that has been handed down through the generations. The villages are surrounded by forest and the Mahafaly are heavily dependent upon forest resources for most of their needs. As a result, they know the forest well and this knowledge is readily transmitted to their children who spend considerable time collecting wild fruits and leaves in the forest. Young men who tend herds of cattle and goats some distance from the village also frequently rely on wild plant and animal species for their noon-time meals.

Methods

The ten-month field project was comprised of five major components: 1) a census of the entire population of the village; 2) monthly interviews and observations of 30 households; 3) interviews and observations of local healers; 4) the collection and preliminary identification of voucher specimens of medicinal plant species; and 5) health status measurements of the study sample.

After conducting the census, a representative sample (based on gender, age, household composition, lineage, polygamy) of 30 households (133 individuals: 71 adults and 62 children under 18) was chosen for detailed study (27 percent of the population, 23 percent of the households) (see Table 2). Each household was interviewed monthly concerning illnesses experienced in the household during the month, their beliefs concerning the causes, the treatments used, and the outcomes. Information was also collected on the use of non-cultivated plant species for food, medicine, and construction, on major social obligations that had to be met during the preceding month, and on diet and social contacts in the preceding 24 hours. Other information on religious beliefs and cosmology, social organization and the functions of kin groups was collected during the entire period of study. Pregnant and postpartum women were asked about the occurrence of any symptoms resulting from pregnancy and childbirth, about dietary restrictions or supplements, and about any other changes in daily routine.

Nine traditional healers in the region were interviewed concerning their training, treatment techniques, and medical beliefs, and several healing sessions were observed. Ten

other healers were identified but not interviewed due to the difficulty of transportation during the rainy season.

Voucher specimens of 95 percent of the medicinal plant species used (143 out of 150) were collected, pressed and dried, and verified with most of the villagers who had reported using them (see Table 3). Preliminary identifications of 121 medicinal species were made by two botanists in the field. The specimens are currently at the Missouri Botanical Garde, St. Louis, for final determinations. Specimens of 72 species have also been collected, dried, crushed, and prepared for future chemical testing; they are currently stored at Washington University.

Thirty-seven of the 38 species used for pregnancy and neonatal and postpartum care were collected; most have been identified. Five species have been screened for secondary compounds and material from additional species has been collected for analysis.

Physical measurements relating to health status (height, weight, pulse, respiration rate, blood pressure, skinfold thickness, arm and head circumference, vision test, hearing test, teeth, and current symptoms) were obtained from adults at six-month intervals and on pregnant women and children under six years of age at three-month intervals. All individuals in the study households were measured.

Results

Fertility and Infant Mortality Rates

In the 30 study households, there were 17 women of childbearing age who were married (see Table 4). Of these women, 15 were pregnant sometime during the 14 months from December 1986 to February 1988. Six were pregnant when I left the field in February and 11 gave birth during the 14-month interval (two both gave birth during the period and were pregnant again when I left). Of the two who were not pregnant, one left her husband during the study period; the other was married to an elderly man (65-70) who had many wives but only one child and presumably had fertility problems. There were two additional women in the sample who gave birth out of wedlock. Data on their pregnancies are included in the following tables and the data presented in the remainder of this paper are based on these 17 women.

The Malagasy love children and, in general, wish to have as many as possible. Their religion honors an ancestor cult and consequently, they wish to have as many descendants as possible. Given these data on pregnancies, fertility does not appear to be a problem among the Mahafaly of this region, and there are few reports of complications during labor and childbirth.

Of the 13 full-term pregnancies from December 1986 to February 1988, one resulted in stillbirth after three and one-half days of labor. The other 12 women reported labor of

relatively short duration (two to 24 hours--most under six hours) and relatively easy deliveries (see Table 5).

Infant mortality, however, has been reported to be quite high among the Malagasy in general (177/1000 live births) and this appears to be true among the Mahafaly as well. Of the 13 pregnancies, there were 13 infants born alive and one stillbirth. Subsequently, one twin died within two days and one infant died at five and one-half moths, yielding an infant mortality rate of two per 13 (or 154/1000) which is very close to the national rate of 177/1000. (This may be an underestimate because I left the field before all the infants reached six months of age.)

There were no miscarriages reported during the 14 month interval but they were reported quite frequently in the past. Among these 17 women, they have 63 living children out of 92 pregnancies (i.e., 68 percent of their pregnancies have yielded children who are still alive, or alternatively, one-third of all pregnancies did not result in surviving offspring) (see Table 6). Including data on their past histories, these women have a reported child/infant mortality rate of 12 deaths per 75 live births or 160/1000.

While infant and child mortality rates are high, maternal mortality rates appear to be quite low and I only heard of one case occurring in a neighboring village during the 10 months I was there (and in this case both mother and infant died). Individuals marry and separate quite frequently and I suspected that perhaps one reason why men have been married so many times is that they may have lost wives in childbirth. Nonetheless, almost all previous spouses were reported to be currently alive and no man reported ever having lost a wife in childbirth.

Pregnancy

When a woman discovers she is pregnant (usually at two months), the first thing she does is to stop nursing her youngest child if she has a child under three.

If she has had a history of miscarriages, she will most likely visit a traditional healer (*ombiasa*) specializing in this problem. The most frequent diagnosis of the cause of miscarriage is sorcery, and the healer will prepare a talisman for the woman and also give her medicinal plants to drink. Few dietary restrictions were cited during pregnancy, although the most frequently reported was sea salt (which may, in fact, prevent edema).

Pregnant women usually continue their normal activities until the last trimester. At this time, some discontinue their work in the fields while others do not--much depends upon practical considerations, such as the availability of others to perform their tasks, pressing social obligations, and a history of previous miscarriages or difficulty in childbirth.

Some women remained active right up to the time of their labor. For example, one morning a woman walked approximately ten kilometers to a neighboring village to visit a

sick relative and gave birth that same evening at the other village. Another woman, despite the commencement of early labor pains the night before, had walked five kilometers to a neighboring village to sell some beans early in the morning and then walked back another five kilometers, giving birth in her village by noon.

Pregnant women are believed to be susceptible to a condition called *besaro*. This was described by all as consisting of headache and dizziness, although one respondent thought that it could also cause abdominal pain and another thought it produced nausea. Pregnant women also exhibit symptoms of morning sickness but there is no special term or traditional treatment for this syndrome. It is not considered to be dangerous and is believed to be a normal and temporary, albeit uncomfortable, state.

Besaro, which usually begins during the second trimester, however, is believed to be a naturally-caused illness that can lead to complications during childbirth, and therefore, requires preventive measures. *Besaro* is believed to be caused by an over accumulation of blood in the abdomen. Although it is regarded as a naturally caused condition, Mahafaly believe that biomedicine is ineffective in preventing or curing the illness, and only traditional herbal medicine of the ancestors (*olyraza*) is effective against it.

Most women, whether they displayed symptoms or not, took herbal remedies to cure or prevent this illness from the third to fifth month of pregnancy to childbirth (Table 7). Women normally drink a potful (one to two quarts) of such herbal remedies (instead of water) throughout the day.

Eighty percent of those with symptoms of *besaro* drink herbal decoctions and two-thirds of those without any symptoms drink the decoctions to prevent any occurrence of symptoms. Routine care during pregnancy is the responsibility of the woman and her husband. As pointed out previously, in most cases the husband makes final decisions regarding the care and treatment of his wife.

The ten women using decoctions for *besaro* reported using nine different medicinal plants (Table 8). At least one-third of the species are endemic to Madagascar, although the two most popular species (*Sesbania aegyptiaca* and *Panicum maximum*), which are mixed together by some women, are not endemic to the island.

A wide range of uses for these plant species, that could be quite beneficial during pregnancy, has been reported worldwide (Table 9). These species are used for parasites, jaundice, dysentery, dizziness, tonics, anemia, rheumatism, and syphilis. Six of the species have been chemically screened, two by us, and found to contain a wide range of secondary compounds, especially saponins and alkaloids. Moreover, two species exhibit antibacterial (*Indigofera depauperata*) and antiviral (*Gymnemma sylvestre*) activity; and members of the same genera have been found to have anthelmintic, anti-inflammatory, antiflatulent, and antihepatotoxic effects.

Childbirth

A woman in childbirth is usually assisted by her mother or another female relative; in rare instances an elderly woman from her husband's family may assist (such as her mother-in-law) (Table 10). The first child must be born in the woman's natal village and her family assumes responsibility for her care and the infant's care for one to two months. Later births usually occur in the husband's village, in which case the woman's mother temporarily moves to her son-in-law's village to care for her daughter. Again, final decisions concerning the care of the woman and newborn infant are made by the husband and in some cases the father of the woman.

Postpartum Care

Immediately following childbirth and for the subsequent one to three months, mothers are believed to be susceptible to an illness caused by wind (*sinto*) entering the abdomen. New mothers are required to stay inside the house during this period. If they must go outside, they cover themselves completely from head to toe with cloths (*lambas*) or blankets. Normally, women go outside only to go to the bathroom and then return immediately to the house. They drink only hot liquids (decoctions) and bathe in warm water. They are usually cared for by their own mother, or, if she is unavailable or not living, by another elderly female member of her family, by her mother-in-law, or by other women in her husband's family.

For 10 out of 12 pregnancies (83 percent) noted in the study, a woman from the wife's family participated in the childbirth and postpartum care (see Table 10). This person is in charge of cooking for the new mother and her husband and children, for preparing herbal remedies for the mother and infant, and for carrying out any other necessary household chores such as laundry, child care, fetching water, and firewood. She frequently sleeps in the house with the mother and infant (depending upon the availability of alternative housing) and stays with her for one to two months.

During this period the new mother is expected to rest, care for the infant, and heal from the wounds caused by childbirth. She may have visitors and family into her house. Her husband does not sleep in the same house with her during this period and is free to have liaisons with other women until he decides that his wife is well enough to come out of the house.

For the first two months after childbirth, special meals are prepared for the new mother. The first food she is allowed to eat is very wet, soupy rice (*sosoa*) (see Table 11). Then, little by little, corn mush, manioc broth, and later, regular solid foods are added to her diet. It is believed that childbirth causes many internal wounds and that only soft, easily digestible foods should be eaten during the recuperation period. The only food restrictions include cold foods and fruit while the woman is still taking the hot decoctions, and sea salt and fresh milk while she is nursing.

The new mother is given huge quantities of medicinal plant decoctions to drink to aid in the healing process. Her husband usually collects the plants in the forest and the woman's mother or a woman responsible for her care prepares them. There is variation in who decides upon the plant species to use--sometimes the husband makes the decision, sometimes the woman's mother or other caretaker decides, and sometimes the woman herself selects which plants should be used. It appeared to me to depend upon the level of knowledge of the various individuals concerned. Usually a single species is used for five to seven days, then another species is prepared for the next week, and so on. A woman normally continues to drink the decoctions for two to three months, although one women who had recurrent abdominal pain continued the treatment for eight months after childbirth. Although some women did not drink an herbal remedy during pregnancy, all of the women in the sample drank plant decoctions after childbirth.

The 13 women who gave birth during the study used a total of 20 different species of medicinal plants during the postpartum period, at least 40 percent of which are endemic to Madagascar, including three of the most frequently used (See Table 12). Most individuals used a total of three to five different species during the postpartum period; the woman who was in labor for three and one half days and had a stillbirth used eight different species.

Those species used by the Mahafaly for postpartum care have been reported to be used for a number of ailments worldwide (Table 13). Those uses especially relevant to parturition are parasites, childbirth, lactation, rheumatism, syphilis, tonics, antiseptics, diuretics, and dizziness. Seven of the species have been screened, three by us, and contain a wide range of secondary compounds, especially saponins, tannins, phenols, sterols, and alkaloids. We have found no reports on the pharmacological activity of the particular species used in Madagascar, but some other species of the same genera have been reported to have antibacterial, antiarthritic, anti-inflammatory, and diuretic effects.

When her husband feels that she is well and strong enough, he will decide that his wife may leave the house. At this time she resumes her normal activities. While staying inside the house for two months with few responsibilities may at first sound pleasant, the houses are in most cases very small mud or straw huts (from 6x8 to 9x12 feet), stuffy (especially when there is a cooking fire in it for preparing herbal decoctions), and during the hot season, extremely warm and often swarming with flies. In addition, by leaving the house earlier, the period during which husbands are free to court other women is also restricted.

There has been a recent development in the past 30 years, however: the occurrence of possession by spirits called *douany* who possess individuals for their entire lifetimes, periodically make demands upon these individuals, and may give a possessed person healing powers. Women who are possessed by *douany* cannot stay inside the house after childbirth for very long because the *douany* do not like it. They therefore leave the house after one to two weeks. Moreover, it is currently believed by some that women who stay inside for

long periods of time are susceptible to possession by *douany* or other spirits (*angatra*). Consequently, some families have begun to have new mothers leave the house as soon as they feel healthy and rested. When asked about the problem of vulnerability to wind illness, I was told that spirit possession is more dangerous than wind illness, so it is better not to stay in the house.

The recent occurrence of *douany* possession, especially by women, is an interesting phenomenon which requires another paper and further study. It definitely allows women greater freedom and power as a result of healing powers sometimes associated with it and as a result of demands made by the possessing spirit which must be met by the woman's husband to prevent her from becoming ill.

Neonatal Care

Until the age of two months, infants are not regarded as people (*tsy ndaty*) and, if they die, parents are not allowed to mourn them. They are placed in a piece of cloth (*lamba*) and buried almost immediately (within 24 hours) in a tomb southwest of the village that is designated for infants.

Infants between the ages of two months and seven and eight months (when they begin to crawl) are considered to be people (*efandaty*) but those who die may still not be buried in the tomb of their mother's or father's patriline. They are buried quickly in a small casket made of *daro* (*Commiphora* sp.) or *romby* (unidentified) in the same graveyard as the infants. While they may be mourned, mourning is of short duration.

Once infants have begun to crawl, they are buried in the tomb of the father's patriline and caskets of *mendoravy* (*Albizzia* sp.) are constructed for them. (From a psychological point of view, it is interesting to note that children belong predominantly to the father's patrilineage and stay with the father in cases of separation, which are quite common.)

It seems fairly common in Madagascar to not regard young infants as being fully human and to bury infants who die quickly and with little ceremony in areas reserved for children rather than in the ancestral tomb (Heurtebize 1986; Huntington 1973; Kottak 1980). In a culture with such high infant mortality rates, this custom would certainly serve an adaptive function, allowing families to readjust themselves to normal life as quickly as possible with a minimum of economic and, perhaps, psychological strain.

Until they can walk, infants are guarded by special spirits (*angatra renizaza*) ("baby mother spirits") and it is believed that infants can see them, whereas adults cannot. They are also vulnerable to attack by evil or wandering spirits (*angatra*). The guardian spirits are very traditional and are angered if the parents do not closely follow traditional customs, if they break taboos, or if they let evil spirits into the house, because all of these things can potentially harm the infant. If the spirits become angry, they may frighten the infant and

make it cry suddenly or they may make the infant ill to warn the parents that they should follow the ways of the ancestors.

Infants remain in the house with their mother for one to three months. They are usually wrapped in warm clothing and their heads are covered, even in very hot weather. They are bathed only in warm water. There is considerable attention paid to the closing of the fontanelle, and a paste made from *Cedrelopsis grevei* bark and *Henonia scoparia* stems is applied to the top of the head and forehead for several months, until it is closed. Infants' heads are usually covered with knitted wool caps, even in hot weather, to prevent wind from entering the head through the soft spots.

All infants are breastfed by their mothers for one and a half to two and a half years, or until the mother becomes pregnant again (see Table 14). The mean age of the nine infants that were weaned when I was there was 21.5 months, with a range from 13 to 30 months. The reason for weaning in all cases was pregnancy. (There were three additional children in the sample under age three, two who were 14 months old and one who was 10 months old, who were still being nursed and whose mothers were not pregnant.)

Solid foods are introduced at five to six months of age and usually consist of wet, soupy rice (*sosoa*). When rice is not available, a mixture is made from ground corn and ground dried manioc, or the child is simply given the liquid from the cooked corn or manioc.

Greens and some small pieces of well-cooked manioc are introduced at nine to 12 months; by 14 months the child eats the same food as the adults.

All newborns (N=11) are given small quantities (six to eight ounces) of herbal decoctions throughout the day from small gourds with spouts (see Table 15). They are usually given a single species for a week, then another species the next week, and so on, for a total of four to six months, until the child begins to eat solid foods. The Mahafaly consider these decoctions to be food, not medicine.

A total of 15 different species were used for the 11 infants, at least 40 percent of which are endemic to Madagascar, including the most frequently used vine, *Pentatropis madagascariensis*. Approximately one half of the families alternated between two species, while the rest of the families alternated between three to six different species.

The species used for newborns are used elsewhere for parasites, upper respiratory infections, diuretics, diarrhea, fever, flatulence, colic, and tonics (Table 16). The four species that have been screened are rich in alkaloids, saponins, and sterols. Two species are reported to have antibacterial and anti-inflammatory effects and two members of the same genera have been found to contain antiflatulents and decongestants.

Discussion

While some of the Mahafaly practices described here are reported to occur both in other parts of Madagascar and in other parts of the world, other practices are either unique to this group or have received little systematic investigation.

The most widespread practice is seclusion of the new mother in her house for anywhere from 20 to 40 days during which time she is to rest, recuperate, and care for the baby. This has been reported to occur in Mauritius (Louwe ms.), the Philippines (Hart 1965), Southeast Asia (Hanks 1968; Radjahon 1965), the Caribbean (Kitzinger 1982), and Central America (Cosminsky 1982) (see also MacCormack 1982), as well as among at least one other ethnic group of southern Madagascar (Heurtebize 1986).

The next most widespread practice concerns the importance of keeping the new mother warm during the postpartum period and the emphasis that is placed on drinking hot liquids, bathing in hot water, and preventing the intrusion of coldness into the body (Cosminsky 1982; Dubois 1938; Hart 1965; Kimball 1979; Kitzinger 1982; Louwe ms.). "Tonics" are plant decoctions also reported to be used during this period in the Philippines (Hart 1965; Marshall 1985; Morse 1985), Southeast Asia (Coughlin 1965; Kimball 1979), and Oceania (Lepowsky 1985). The most similar descriptions that I have found in the literature concern the practices of the neighboring Antandroy tribe in southern Madagascar (Heurtebize 1986) and of rural residents on the neighboring Indian Ocean island of Mauritius (Louwe ms.). They include seclusion of the mother, an emphasis on keeping her warm, and the fear of illness from wind or coldness trapped in the body. Although Heurtebize (1986) and Louwe (ms.) report that Antandroy and Mauritian new mothers drink plant decoctions during the postpartum period, the composition of the decoctions and the length of treatment are not explored in detail. Rabesandratana (1977) lists some plants that are utilized after pregnancy, but does not note whether they are used as routine care nor the length of time used.

Therefore, there are very few reports in the literature on the use of plant remedies for routine care during pregnancy, the postpartum period, and the first five to six months of life in Madagascar. I have found only two ethnographies in which any mention is made of such practices (Dubois 1938; Heurtebize 1986). Furthermore, in a review of 59 works on the ethnobotany of Madagascar, I found only one plant species listed as being used by pregnant women, five as being used for postpartum care (all among the Mahafaly and neighboring tribes in the southwest), and one as being a tonic for newborns.

It is quite probable that this routine use of plant decoctions is more widespread, at least in Madagascar, than is indicated by the existing literature, especially given their almost universal use by Mahafaly households. These practices are described as being passed down from the ancestors since time immemorial, and the plant decoctions themselves are referred to as *olyraza* or "medicine or remedies of the ancestors."

This use of plants could be easily missed by researchers for a number of reasons. It may not be reported to ethnographers studying illness and healing because the plants are used for routine care rather than for the treatment of any specific illnesses, and their use is decided upon by the families themselves rather than by traditional healers. Also, the plant decoctions given to infants are viewed as food, not medicine, and would not be reported as a form of treatment. Therefore, studies of both healers and treatment for illness may miss this important use of plants. Furthermore, most ethnobotanical research in Madagascar has been conducted by botanists and not ethnographers and has consisted of brief surveys of plants used by traditional healers rather than on the knowledge and use of plants by the lay population. This research is also centered on the use of plants to treat specific symptoms or illnesses rather than routine care. Researchers most likely to discover these uses are either those focusing specifically on pregnancy and child care or those investigating the use of non-cultivated plant species by the local inhabitants.

I, in fact, first stumbled on the data concerning care during pregnancy not by asking questions in monthly interviews concerning medical beliefs and practices, but rather while asking about the use of forest resources during the previous month. Also, during my first interview, fortunately, a mother was feeding her four month old infant a decoction from a small gourd, and this observation led me to systematically question her and others about the plant decoctions given to infants.

The ethnobotanical and pharmacological data suggest that the plant species used for routine treatment by the Mahafaly for mothers and infants may have important physiological effects--both medicinal and nutritional. While the data on worldwide uses of the species and on the known pharmacological activity of other members of the genera are suggestive, very little is currently known about the actual effects of the particular species used in southern Madagascar.

Most of the identified species are endemic to the island (16/24 or two-thirds), and many are relatively localized in the southern portion of Madagascar. This, along with the fact that little ethnobotanical or ethnographic research has been conducted in this region, explains why so little is known about these species.

We therefore plan to continue our phytochemical analyses of the plant species, and also to perform nutritional analyses on them in the hope of delineating in more detail their specific physiological effects.

Table 1

Causes and Treatments of Illnesses

Causes of Illness	Local Term	Treatment
Displeased ancestors	*raza*	ritual of lineage
Sorcery	*asandaty, vorika*	counterspell/herbs/ talisman
Spirit possession	*douany* *jiny, tambahoaka* *bilo*	ritual/initiation/herbs ritual/initiation/herbs ritual/herbs
Spirit attack	*angatra* (nonspecific) *jiny, tambahoaka* (epidemics)	ritual/herbs/talisman prevention ritual/herbs
Fright (infants)	*angatra renyzaza*	herbs/ritual
God (natural)	*Zanahary*	herbs/biomedicine

Table 2

Population and Sample

Hamlet	Total Population	Number of Individuals in Sample
Analafaly centre	122	55
Ambalatsindro	94	36
Ambinda-Kely	72	36
Mitangaoky	16	3
Ambatovaky	45	
Andreharata	54	3
Antevamena	33	
Ambinda-Be	48	
TOTAL	**484**	**133**

Note: census 8 hamlets
monthly interviews of 30 households
interview and observations of healers (9)
collect (143) and identify (121) voucher specimens of all medicinal plant species used
health status measurements of study sample

Table 3

Plants Included in Study

	Number Used	Number Collected	Number Identified	Number Screened	Number Collected for Analysis
Plants used for care during pregnancy	9	9	7	2	4
Plants used for postpartum care	20	19	13	4	7
Plants given to neonates	15	15	8	1	9
All species used for pregnancy, postpartum, and neonatal care	38	37	23	5	16
All medicinal plant species used	150	143	121	16	72

Table 4

Number of Pregnant Women in Sample
(December 1986 - February 1988)

Age	Women in Sample of Childbearing Age and Married	Number Pregnant
15-20 years	2	1
21-25 years	2	1
26-30 years	6	6
31-35 years	5	5
36-40 years	2	2
Total	**17**	**15**

Table 5

Fertility/Infant Mortality Among 30 Study Households (December 1986 - February 1988)

Fertility	
Number of married women of childbearing age	17
Number pregnant	15
Percent pregnant	88%
Childbirth Complications[a]	
Number of full term pregnancies	13
Number of live births	13[b]
Number of stillbirths	1
Pregnancies with complications	77/1000
Infant Mortality	
Number of live births	13
Number of infant deaths (≤ 6 months)	2
Infant deaths/live births	154/1000

[a]includes two single women who gave birth
[b]one woman gave birth to twins

Table 6

Fertility/Infant Mortality Data
For 17 Women Throughout Their Lifetimes

		Rate/# of Pregnancies
Number of pregnancies	92 (Range: 1-11)	
Number of live births	75 (Range 1-10)	810/1000
Number stillborn	8 (Range: 2-3; N=3 women)	87/1000
Number of miscarriages	10 (Range: 1-5; N=5 women)	109/1000
Number of children currently alive	63	684/1000
Pregnancies not yielding surviving offspring		32/100
Infant/child mortality rate		12/75 = 160/1000 live births

Table 7

The Use of Herbal Remedies for Besaro During Pregnancy

	Number	Percentage
Women pregnant (≥ 4 months)	13	--
Symptoms of *besaro* present	10	77% (of all pregnant women)
Taking remedy for symptoms	8	80% (of those with Sx)
Taking remedy for prevention	2	67% (of those without Sx)
Total taking remedy	10	77% (of all pregnant women)
Month treatment started		
Third	1	10%
Fourth	7	70%
Fifth	2	20%

Table 8

Medicinal Plants Used During Pregnancy (*Besaro*)

Family	Species	Local Name	Parts Used	Endemic (+\-)	Frequency Used*
Fabaceae	*Sesbania aegyptica*	Kantsakantsa	Leaves	-	5
Poaceae	*Panicum maximum*	Ahibe	Leaves/Stem	-	4
Sphaerose-palaceae	*Rhopalocarpus lucidus*	Tsiongake	Stem	+	2
Rubiaceae	*Enteros-permum pruinosum*	Manjaka	Leaves/Stem	+	2
Euphorbi-aceae	*Phyllanthus casticum*	Sanira	Leaves/Stem	+	2
Asclepiadaceae	*Gymnema sylvestris*	Tsiompiha	Leaves/Stem	-	2
Fabaceae	*Indigofera sp.*	Engatsy	Leaves/Stem		2
Euphorbi-aceae	*Croton sp.*	Tsiavalake	Stem		1
Verbenaceae	*Clerodendrum sp. cf. emirnense*	Forombitike	Stem		1

*Number of women who used this remedy during pregnancy (N=10)

Table 9

Uses, Secondary Compounds, and Pharmacological Activity of Plant Species Used During Pregnancy (N=9)

Some reported worldwide uses of the species (1)	Secondary compounds contained in the species (2)	Known pharmacological effect (3)
Parasites (4)	Saponins (6)	**Species**
Jaundice (3)	Alkaloids (5)	Antibacterial (1)
Dysentery (2)	Sterols (2)	Antiviral (1)
Dizziness (2)	Tannins (2)	**Genus**
Tonic (2)	Phenols (1)	Antibacterial (2)
		Antimicrobial (1)
Anemia (1)		Antiviral (1)
Rheumatism (1)		Anthelmintic (1)
Syphilis (1)		Anti-inflammatory (1)
Diuretic		Anti-hepatotoxic (1)
Anti-diabetic		Antiflatulent (1)
		Uterotonic (1)

(1) Ravalinera (1909); Heckel (1910); Pernet and Meyer (1957); Debray and Razafindrambao (1971); Lewis and Elvin-Lewis (1977); Rabesandratana (1977); Java et al. (1978); Chakrabartty et al. (1984); Singh et al. (1984); Iyengar et al. (1986).
(2) Debray and Razafindrambao (1971); Java et al. (1978); Fojas et al. (1982).
(3) Bally (1937); Java et al. (1978); Fojas et al. (1982); Chakrabartty et al. (1984); Osore et al. (1984); Oliver-Bever (1986); Patel et al. (1986).

Table 10

Postpartum Care	Number
Person responsible for care of woman during childbirth and postpartum period	
Woman's mother	5
Other female relative of woman	3
Both mother and mother-in-law	2
Mother-in-law	1
Other female relative of husband	1
Length of time woman remained inside the house	
Mean number of months	1.3
Range	0.5 - 2.5 months
Percentage of women taking herbal decoctions after childbirth	100%
Average length of treatment	2-3 months

Table 11

Diet Following Childbirth

1-2 weeks	wet rice (*sosoa*) only (may add curdled milk)
2 weeks - 2 months	well cooked manioc, corn, or rice
2 months	normal diet
Other restrictions	
sea salt	while nursing
fresh milk	while nursing (1 year)
"cold" food (such as fruit)	while taking hot herbal decoctions

Table 12

Medicinal Plants Used in Postpartum Care

Family	Species	Local Name	Parts Used	Endemic	Frequency
Asclepiadaceae	Cynanchum compactum compactum	Vahimasy	Stem	+	7
Burseraceae	Commiphora simplicifolia	Sengatse	Roots/Stem	+	7
Rubiaceae	Gardenia sp.	Volivaza	Roots/Stems		7
Bignon iaceae	Rhigozum madagascarense	Hazontaha	Stem	+	4
Convolvulaceae	Metaporana parvifolia	Kililo	All vine	+	3
Euphorbiaceae	Jatropha curcas	Savoha	Leaves/Stem	-	3
?	?	Karimbola	Stem		3
Anacardiaceae	Operculicarya decaryi	Jiabihy	Bark	+	2
Burseraceae	Commiphora brevicalyx	Taraby	Stem	+	2
Burseraceae	Commiphora sp.	Darosiky	Stem		2
Hippocrataceae	Hippocratea anagustifolia	Vahipinde	Stem		2
Poaceae	Panicum maximum	Ahibe	Stem/Leaves	_	2
Asclepiadaceae	Secamone sp.	Angalora	Leaves	+	1
Asclepiadaceae	Leptadenia madagascariensi	Taritarike	Stem	+	1
Fabaceae	Indigofera sp.	Hazomby		+	1
Fabaceae	Sesbania aegyptica	Kantsakantsa	Stem	_	1
Hernandiaceae	Gyrocarpus americanus	Kapaimpoty	Stem	_	1
Poaceae	Zea mays	Tsako	Husks	_	1
Verbenaceae	Clerodendrum sp. cf. emirnense	Forombitike	Stem		1
?	?	Maintifotrotsy	Stem		1

*Number of women using plant species (N=13)

Table 13

Uses, Secondary Compounds, and Pharmacological Activity of Plant Species Used During Postpartum Period (N=20)

Some Reported Worldwide Uses of the Species (1)	Secondary Compounds Contained in the Species (N=7) (2)	Known Pharmacological Effects (3)
Anthelmintic (3)	Saponins (7)	Genus:
Childbirth (2)	Tannins (5)	Antibacterial (2)
Lactation (2)	Phenols (4)	Antiarthritic (1)
		Anti-inflammatory (1)
Rheumatism (2)	Sterols (4)	Diuretic (1)
Syphilis (2)	Alkaloids (3)	Anthelmintic (1)
Tonic (2)	Flavonoids	Induce uterine contractions (3)
Antiseptic		Antiseptic (1)
Appetite Stimulant		Carminative (1)
Diuretic		
Dizziness		

(1) Watt and Breyer-Brandwijk (1962); Debray and Razafindrambao (1971); Lewis and Elvin-Lewis (1977); Rabesandratana (1977); Sofowora (1982); Singh et al. (1984); Oliver-Bever (1986).

(2) Debray and Razafindrambao (1971); Chalandre and Bruneton (1986); Oliver-Bever (1986).

(3) Heckel (1910); Pernet and Meyer (1957); Watt and Breyer-Brandwijk (1962); Papagiorigiou (1980); Kakrani (1981); Fojas et al. (1982); Sofowora (1982); Osore et al. (1984); Singh et al. (1984); Tripathi et al. (1984); Adewanni and Odebiyi (1985); Iyengar et al. (1986); Oliver-Bever (1986); Fouri and Snyckers (1989); Hastings (1990).

Table 14

Infant Care

--Percentage given herbal decoctions (6-8 oz)	100%
--Length of treatment with herbal decoctions	4-6 months (until started on solid foods)
--Foods given to infants	4 months - rice powder and water (mother had problem lactating) 5-6 months - wet rice, manioc and corn water or manioc and corn powder 9-12 months - introduce greens 14 months - regular meals
--Age of weaning (N=9)	
mean age	21.5 months
range	13-30 months
--Reasons for weaning	Pregnancy (in all cases)

Table 15

Medicinal Plants used in Treating Newborns

Family	Species	Local Name	Parts Used	Endemic(+/-)	Used*
Asclepiadaceae	Pentatropis madagascar-iensis	Tsinainkibo	All (vine)	+	7
Euphorbiaceae	Croton sp.	Kelihangatse	Leaves/Stem		3
?	?	Manjaka ambanikily	Leaves/Stem		3
Amaran-thaceae	Henonia scoparia	Fofotse	Stem	+	2
Rubiaceae	Enteros-permum pruinosum	Manjaka	Leaves	+	2
Rubiaceae	Paederia grevei	Tamborobe	Roots	+	2
?	?	Ringatra	Stem		2
Liliaceae	Aloe divaricata	Vaho	Roots	+	1
Rubiaceae	Gardenia sp.	Volivaza	Root/Stem		1
Rubiaceae	Paederia sp.	Tamborosay	Roots	+	1
Sapindaceae	Allophyllus decaryi	Sarivoamanga	Leaves/Stem	+	1
Sapindaceae	Cardios-permum halicacabum	Voafariha	Leaves	-	1
Verbenaceae	Clerodendrum sp. cf. emirnense	Forombitike	Stem		1
?	?	Tsilavondri-votra	Stem		1
?	?	Taimborotsi-loza	Stem/Leaves		1

*Number of infants given the plant species (N=11)

Table 16

Uses, Secondary Compounds, and Pharmacological Activity of Plant Species Used for Neonatal Care (N=15)

Some reported worldwide uses of the species (1)	Secondary compounds contained in the species (N=4) (2)	Known pharmacological effects (3)
Parasites (4)	Alkaloids (4)	Species:
Diuretic (3)	Saponins (3)	Anti-inflammatory (2)
Fortifier/Anemia (3)	Sterols (2)	Antibacterial (2)
Upper respiratory infection (3)	Phenols (1)	
Diarrhea (2)	Tannins (1)	Genus:
Fever (2)	Tannins	Anthelmintic (1)
		Antiflatulent (1)
Flatulence/Colic (2)		Decongestant (1)

(1) Heckel (1910); Pernet and Meyer (1957); Debray and Razafindrambao (1971); Rabesandratana (1977); Sussman (1983); Iyengar et al. (1986).
(2) Debray and Razafindrambao (1971); Shukla et al. (1973); Kumaresan (1981).
(3) Shukla et al. (1973); Chandra and Sadique (1984); Davis et al. (1986); Declume et al. (1986); Patel et al. (1986); Sadique et al. (1987).

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