

Bakera, a herbal steam bath for postnatal care in Minahasa (Indonesia): Documentation of the plants used and assessment of the method

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Received 5 July 2006; received in revised form 12 January 2007; accepted 12 January 2007

Available online 19 January 2007

Abstract

Bakera, a steam bath prepared with various plants, is a traditional method used in Minahasa (North Sulawesi, Indonesia) for recuperation after childbirth. Semi-structured interviews were conducted with 14 midwives and 166 mothers in different villages of Minahasa, in order to document the preparation and plants used for the *bakera*. Overall, the use of 60 different plant species for the *bakera* was recorded. Among the 10 most frequently cited *bakera* plants, eight are essential oil plants, which are usually cultivated in the kitchen gardens and often used as spices. The therapeutic effects of thermotherapy and aromatherapy contribute to the effectiveness of the *bakera*. Thermotherapy soothes symptoms such as muscular strain, heaviness in the limbs, edema, loss of appetite, and constipation, whereas the essential oils of the plants used have an immuno-stimulant, antiseptic, and antiphlogistic effect. If applied under the guidance of an experienced person, during the late childbed, the *bakera* can be regarded as an effective and safe method for recuperation after child birth.

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Keywords: Aromatherapy; Balneotherapy; Ethnobotany; Medicinal plants; Southeast Asia; Thermotherapy

1. Introduction

Medicinal plants play an important role in pre- and postnatal care in many rural areas of the world (Lefeber and Voorhoeve, 1998). Plants used to influence and treat obstetric and gynecological conditions and disorders such as fertility problems, birth control, complications during pregnancy and birth have been documented for various ethnic groups (e.g., Singh et al., 1984; Browner, 1985; Bourdy and Walter, 1992; Varga and Veale, 1997; Jain et al., 2004; Ticktin and Dalle, 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 (Lefeber and Voorhoeve, 1998; van Eeuwijk, 1999). However, in the context of the introduction and modernization of primary health care systems in rural areas, and with training programs for traditional birth attendants in Western medicine, this traditional knowledge has often been neglected (Jordan, 1989). On the other hand, a general trend towards a broader use of herbal medicine for pre- and postnatal care can

be observed in the Western health care system (Falch et al., 2002). Besides plant-derived medicine, which is administered orally, aromatherapy plays an important role in this context (Stachowiak, 2002).

A traditional method to apply essential oils to the body is the herbal steam bath (Holmes, 1997). This method probably dates back to the late Pleistocene with an early distribution center in Northeast Asia (Wolters, 2005). From North to South America, herbal steam baths are used by various indigenous groups to treat pain, rheumatism and respiratory diseases, but also for women around child birth (Wolters, 2003, 2004). Similar applications are known from Southeast Asia (de Guzman, 1999; Bunyaphatsara and van Valkenburg, 2001). The use of herbal steam baths to support the recuperation of women after childbirth have been documented for different ethnic groups in the hills of northern Thailand but also among the Thai in the lowlands (Anderson, 1993; Wang et al., 2003). In Indonesia they are known from Sumatra and Java (Siagian, 2002; L. Mona, 2005, Personal Communication). In North Sulawesi, the steam baths are called *bakera*, which was first described in some detail by Watuseke (1970). His essay is based on sporadic observations in Tondano in 1962. More precise descriptions of the use of medicinal plants in the Minahasa region are found by van Eeuwijk

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(1999). He mentions the use of the *bakera* and other traditional therapies before and after childbirth.

To date a detailed documentation of the *bakera* plants and the preparation of the steam bath in the Minahasa region is lacking. The *bakera* is still widely used and midwives and women hold the knowledge of its preparation. The aim of the present study is to systematically document this knowledge in order to sustain it and make it available in the local health care centers. Based on literature search and discussions with two medical doctors and specialists in Switzerland we evaluate the therapeutic effects of the *bakera* steam bath and the plants used and assess the safety of the method. The opinion of the medical doctors and specialists (cited as personal communication and listed under references) is summarized under Section 5.2, whereas all the information given under Section 4 does reflect the knowledge of the local people.

2. Research area

2.1. Geographical aspects and agriculture

The island of Sulawesi is located in the Malay Archipelago and forms the fourth largest island of Indonesia. The research area is part of the Minahasa region (0°25'–1°58' north latitude and 124°20'–125°20' east longitude) located in the province of North Sulawesi (Fig. 1).

The permanently humid climate in combination with the volcanic soils allows agriculture in most areas of the Minahasa region. Thus, the original tropical forest has been almost completely converted into agrarian land, with only few patches of secondary forest left. Besides numerous rice paddies and homegardens, there are huge forest gardens for permanent horticulture, usually specializing in a small number of cash crops but with up to 120 different cultivated species (Brodbeck, 2004).

Clove (*Syzygium aromaticum*), coconuts (*Cocos nucifera*) and nutmeg (*Myristica fragrans*), the main cash crops of Minahasa region, are mainly produced in monocultural plantations.

2.2. Population

Approximately 1.3 million people inhabit the Minahasa region. The Minahasa, who still form the ethnic majority, are linguistically and culturally closely related to the people of the Southern Philippines (Whitten et al., 2002). Especially in the cities, the cultural heterogeneity is growing. Due to the missionaries' activities in the last few decades of the 20th century, 80% of the inhabitants of Minahasa are Christians; 19% are Muslims and the remaining Hindus and Buddhists (BPS, 2005).

Since the first half of the 19th century Dutch colonialists and Christian missionary organizations had a strong influence on the development of the region, promoting health care and education (Whitten et al., 2002).

2.3. Health care system and midwifery

Since the declaration of Alma-Ata and its target "Health for All by the Year 2000" by the World Health Organization (WHO), primary health care programs have been developed in many Indonesian regions, including Minahasa (WHO, 1978). Traditional practitioners, traditional midwives, and local herbalists have been incorporated into public and private health projects and one health center in each district has been constructed. These centers are responsible for vaccinations, nutrition, family planning, latrines, etc. in the villages. According to official statistics for 2003, there are 60 health centers and 15 hospitals in the 51 districts of the Minahasa region (BPS, 2003). To date, there is a governmental program to integrate modern health care systems and traditional systems in Indonesia. In each province a 'Sen-

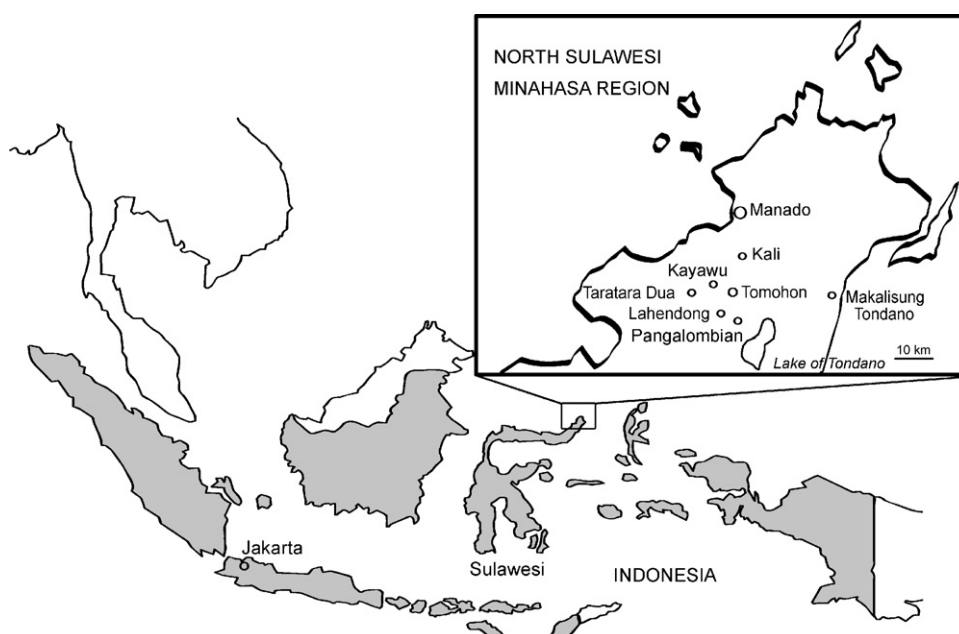


Fig. 1. Research area.

tra P3T' (Centre of Research and Development of Traditional Medicine) is to be established. In Manado the center opened in 1996. It is also supported by the 'Traditional Medicine Program (OAI)' of the Health Foundation of the Protestant Church of Minahasa.

In the mid-1990s the government launched a project to build an outpatient clinic in every village with a biomedically trained midwife. Today only a few traditional midwives live in the villages investigated, and among them, only a few still act as midwives. Their focus of attention has been shifted from assistance during childbirth to postpartum maternal and childcare. Many female villagers count on the service of the local midwife after childbirth in hospital.

3. Methods

Field research was conducted by the first author during 6 months from August 2004 to January 2005. Participant observation, structured and semi-structured interviews in Indonesian were carried out in nine different villages of six districts in the Minahasa region (Fig. 1). In the following villages 14 traditional midwives (45–76 years old) were interviewed: Pangalombian (1), Lahendong (2), Kayawu (2), Taratara Dua (3), Kali (3), and Makalisung Tondano (3). They were chosen by snowball sampling, i.e., employees of the 'Traditional Medicine Programme (OAI)' asked key individuals for the names of traditional midwives. During each semi-structured interview a local companion of the OAI helped to sort out linguistic problems in case of misunderstandings. Afterwards the audio-recorded files (recorded with a MP3-recorder and microphone, agreed to by the interviewees) were transcribed.

In the village of Taratara Dua, additional 90 mothers (20–77 years old) who had given birth to at least one child were interviewed. They were chosen by snowball sampling. Besides making audio recordings of the interviews, a questionnaire was completed. Exceptionally, a local companion was asked to translate the questions into the local language, especially for elderly women.

In the hospitals of Manado (RS Pancaran Kasih) and Tomohon (RS Bethesda) a total of 76 women (18–40 years old) were questioned. Once a week, all the women in childbed present in the hospitals were interviewed and a questionnaire was completed.

All interviews were carried out to acquire information on pre- and postnatal care practices, with special emphasis on the use and preparation of the *bakera* steam bath, its importance, and the plants used. For the calculation of the use-reports, the mention of a plant species by an interviewee was counted. A *t*-test was conducted to determine significant differences of the first application of *bakera* after childbirth and the number of plants per recipe between the midwives and the mothers.

Since most of the documented plants are commonly cultivated garden plants, they were usually identified on the spot. The plants were vouchered, if the identification was in question. The voucher specimens were identified at the herbarium Bogoriense (BZ) of the Research Center for Biology, Indonesian Research Institute (LIPI), Bogor, using the *Flora Malesiana* (van

Steenis, 1948) and *Flora of Java* (Backer and Bakhuizen van den Brink Jr., 1963). Herbarium specimens have been deposited in the herbarium Bogoriense (BZ) and the herbarium Z/ZT of the University and ETH Zurich. The nomenclature follows *Erhardt & Zander's Dictionary of Plant Names, The European Garden Flora* and the compiled list of the *PROSEA* handbooks (Walters, 1989; Cullen, 1995, 1997, 2000; Erhardt and Zander, 2002). Local plant names, mainly in Indonesian and the regional Manado-Malay dialect, have been added according to the studies by van Steenis (1992), Ria Hutapea (1994), Wagner and Suter (2000), Lampah et al. (1998), and Dalimartha (2004) and confirmed by plant specialists at the 'Traditional Medicine Program (OAI)' in Tomohon, the Faculty of Agriculture at the University in Manado (UNSRAT), and the Research Center for Biology, Indonesian Research Institute (LIPI), Bogor.

The study was performed according to the biodiversity rights of Indonesia and all information is published with the agreement of the interviewees. For detailed information see also Zumsteg (2005).

4. Results

4.1. *Bakera*, a herbal steam bath for postnatal care

4.1.1. Preparation and application of the *bakera*

For recuperation after childbirth a traditional method called *bakera* is often applied in Minahasa households. Fresh plants are collected in the homegardens and nearby fields or are bought at the market by traditional midwives or by the families of the women in childbed, usually a day before the preparation of the *bakera*. The application takes place before sunrise, as high daytime temperatures would be too stressful for the women's cardiovascular system. For the preparation of the steam bath, at least 10 l of water are heated up in a bucket. The women measure the ingredients by hand or count the bigger parts of the plants such as rhizomes, stalks, branches or fruits. Plant species or plant parts can be substituted, depending on the availability. Some women stress the necessity that the sum total of plant ingredients is a specific odd number. For mythological reasons connected with the story of Minahasa's origin the favorite number is nine.

The plants are washed and chopped. As soon as they are added to the boiling water, jointly or in two portions, the whole room is filled with a spicy fragrance. A lid is put on the bucket, which is placed under a wooden chair, whose seat forms a slatted frame, so that the steam can reach the woman's buttocks and vulva. The woman is wrapped up in a linen sheet and a blanket. There are some midwives who cover the woman's hair as well, whereas others state the hair must not be moistened by the steam. Once the woman is seated, the midwife lifts the lid of the bucket very slowly, so as not to overheat the woman.

The midwife watches the woman's face, wipes the sweat off her forehead and her neck, and dictates the rhythm of inhaling and exhaling. The midwife has to see to it that the woman does not faint or get burnt by the hot water. After the application, the woman may take a shower, which means that she pours cold water over her head and body with a small bucket, while the

Table 1
Preparation and application of the *bakera* steam bath in North Sulawesi, Indonesia

	Interviewees	
	Traditional midwives (<i>n</i> = 10)	Mothers of Taratara Dua (<i>n</i> = 47)
First time of <i>bakera</i> application in days after childbirth	12.9 ± 8.5	18.2 ± 20.9
Frequency of application	Once after childbirth up to four times a week	Twice a month up to twice a day
Total period of applications in days	14, or at the discretion of the users	7–360
Duration of application	20 min, or till the water is cold, or at the discretion of the midwife	5–90 min, or till the body is warm or the water cold
Person who prepares the <i>bakera</i>	Midwife	Grandmother, husband, an elderly person, user herself, midwife
Number of plant species per recipe	9.1 ± 4.6	3.2 ± 1.2

midwife is washing the baby in the *bakera* infusion diluted with cold water. Another part of the infusion may later be used as a kind of herbal tea. The plants used for the first *bakera* can be used again within a week. Such further applications of the *bakera* will usually not be supervised by the midwife any more; it is left to the discretion of the woman and her family.

4.1.2. Distinctions in preparation and application

In the preparation and application of the *bakera* the traditional midwives and the mothers interviewed in Taratara Dua differ in some respects (Table 1). In general, the use of the *bakera* is more uniform among the midwives. Midwives start with its application for women in home confinement between three and 30 days after childbirth; the majority of them, namely 60%, begin to apply the *bakera* between 7 and 14 days. The mothers (not supervised by midwives) start between one and 90 days, but there is no significant difference regarding the mean of the first time of application.

For the midwives it is important to prepare the *bakera* for the woman in childbed at least once after childbirth whereas some mothers apply it up to twice a day. The midwives use significantly more plants per recipe than the mothers ($p < 0.001$).

It may also happen that midwives prepare the *bakera* for men or elderly women who feel weak. Thus, the steam bath is not exclusively used for women in childbed.

4.1.3. Reasons for the application of the *bakera*

Answering the question “Why do you use the *bakera*?” all of the mothers interviewed in Taratara Dua were convinced that the *bakera* contributes to the woman’s recuperation and the restoration of her body, as well as the prevention of diseases (Table 2).

Table 2
Reasons for the use of the *bakera* after childbirth given by mothers interviewed in the village Taratara Dua, North Sulawesi, Indonesia (*n* = 50)

Reasons	Number of answers ^a
To recuperate, stay healthy and restore the mother’s strength	50
To induce perspiration	13
To follow the local tradition	6
To feel fresh, clean, and at ease	4
To raise the body temperature	4
To get rosy cheeks	4
To prevent dizziness	2

^a More than one answer per interviewee allowed.

They also mentioned that the herbal steam bath activates blood circulation and perspiration, so that the body can get rid of so-called ‘poisonous and pernicious sweat’. Further more it may contribute to the elimination of the remaining blood, mucus, and placental tissue (lochia), and the “dirty water of the baby”, as well as the contraction of the womb, and it may help the body to regain its pre-pregnancy shape and muscle tone. Similar reasons for the use of the *bakera* were given by women in hospital confinement and by traditional midwives.

4.2. Plants used for the preparation of the *bakera*

All together 60 different plant species belonging to 34 families were documented to be used for the *bakera* (Table 3). Among the midwives 38 species were recorded and 43 among the mothers, whereas 21 species were mentioned by both groups. Most people prefer a specific mixture of plants that is recommended either by a local midwife or knowledgeable family members. This tradition is past down from generation to generation. Depending on the species and tradition various plant parts such as bulbs, rhizomes, stalks, buds, leaves, flowers, fruits, seeds or even the whole plants are used for the *bakera* preparation. Rhizomes, bulbs and fruits are usually chopped whereas other parts are used as a whole.

Overall 408 use-reports have been collected, 91 among the midwives, and 317 among the mothers. The most cited species among the midwives and the mothers are shown in Fig. 2. If the results for the midwives and the mothers are combined, *Citrus hystrix* (kaffirlime; 14.5% of total use-reports), *Cymbopogon citratus* (lemongrass; 14.5%), *Syzygium aromaticum* (clove; 14.2%), and *Myristica fragrans* (nutmeg; 12.7%), are the most favored plants for the *bakera* (Fig. 2). Clove and nutmeg, which are said to warm up the body, are especially often used in Taratara Dua and may reveal a local specialty. Kaffirlime is used as a charme against evil and lemongrass perfumes the body. Palm lily (*Cordyline terminalis*), which is also favored as ingredient of the *bakera*, plays an important role in Minahasa. It is a natural sign to mark properties and to keep away evil things, so it usually grows on the border between neighbours’ houses, gardens or fields and it is part in many ceremonies.

The *bakera* plants are mainly grown in homegardens or in cultivated fields near the village. The midwives tend to spend more time on the collection of the plants while the mothers mainly use ingredients found in the close vicinity.

Table 3

Plants used for the steam bath *bakera* in the Minahasa region, North Sulawesi, Indonesia.

Scientific name and botanical family	Specimen number	Local names	Parts used	Midwives (n = 10)	Mothers (n = 109)
<i>Acorus calamus</i> L. (Araceae)	ZUIS6	Karimenga	rh	2	2
<i>Allium cepa</i> var. <i>ascolonicum</i> Backer (Alliaceae)		Bawang merah	bu	1	
<i>Allium sativum</i> L. (Alliaceae)		Bawang putih	bu, wh	5	4
<i>Allium tuberosum</i> Rottler ex Sprengel (Alliaceae)	ZUIS15	Sasauten	lv	1	2
<i>Alpinia galanga</i> (L.) Willd. (Zingiberaceae)		Lengkuas	rh	4	3
<i>Annona muricata</i> L. (Annonaceae)		Sirsak	lv		1
<i>Apium graveolens</i> L. (Apiaceae)		Selderi	lv		1
<i>Averrhoa</i> sp. (Oxalidaceae)		Belimbing	lv		1
<i>Carica papaya</i> L. (Caricaceae)		Papaya	lv		3
<i>Centella asiatica</i> (L.) Urb. (Apiaceae)		Kaki kuda	lv		1
<i>Cinnamomum</i> sp. (Lauraceae)		Kayu manis	lv		2
<i>Citrus aurantiifolia</i> (Christm.) Swingle (Rutaceae)		Jeruk nipis	lv		3
<i>Citrus hystrix</i> DC. (Rutaceae)		Lemon suangi, Lemon	fr, lv	10	38
		popontolen			
<i>Citrus</i> sp. (Rutaceae)		Lemon	lv		1
<i>Clerodendrum fragrans</i> (Vent.) R.Br. (Verbenaceae)		Sesewanua	lv	1	2
<i>Cocos nucifera</i> L. (Arecaceae)		Kelapa	lv		1
<i>Codiaeum variegatum</i> (L.) Blume (Euphorbiaceae)	ZUIS20; ZUIS21	Luli, Werot	lv, st	1	17
<i>Cordyline terminalis</i> (L.) Kunth (Agavaceae)	ZUIS19	Tawaang	lv, st	4	14
<i>Coriandrum sativum</i> L. (Apiaceae)		Ketumbar	se	3	
<i>Cuminum cyminum</i> L. (Apiaceae)		Jinten	se	3	
<i>Curcuma longa</i> L. (Zingiberaceae)		Kunir	lv	1	2
<i>Curcuma xanthorrhiza</i> Roxb. (Zingiberaceae)	ZUIS8	Tumbulawak	rh	4	12
<i>Cymbopogon citratus</i> (DC.) Stapf (Poaceae)		Bramakusu, Sarimbata	st	4	44
<i>Cymbopogon nardus</i> (L.) Rendle (Poaceae)	ZUIS13	Sereh popontolen	st	5	9
<i>Garcinia mangostana</i> L. (Clusiaceae)		Manggis	lv, st		1
<i>Graptophyllum pictum</i> var. <i>viride</i> Hassk. (Acanthaceae)		Raramdam putih	lv	1	
<i>Graptophyllum pictum</i> var. <i>lurido-sanguineum</i> Sims (Acanthaceae)		Raramdam merah	lv	1	
<i>Hemigraphis alternata</i> (Burm.f.) T. Anders. (Acanthaceae)	ZUIS9	Kesow kesow	lv, st	1	
<i>Hemigraphis</i> cf. <i>repanda</i> (L.) Hallier f. (Acanthaceae)	ZUIS5	Lire	lv, st	1	
<i>Imperata cylindrica</i> (L.) Raeusch (Poaceae)		Kusu-kusu	lv		1
<i>Jatropha curcas</i> L. (Euphorbiaceae)		Balacai, Saketa	lv, st	1	8
<i>Kaempferia galanga</i> L. (Zingiberaceae)		Kencur	rh		1
<i>Lansium domesticum</i> Corrêa emend. Jack (Meliaceae)		Langsat	lv, st		2
<i>Loranthus</i> sp. (Loranthaceae)		Benalu	lv		6
<i>Mangifera indica</i> L. (Anacardiaceae)		Mangga daun	lv, st		2
<i>Melaleuca leucadendra</i> L. (Myrtaceae)	ZUIS16	Kayu putih	lv, oil	1	7
<i>Michelia</i> sp. (Magnoliaceae)		Cempaka			1
<i>Musa</i> sp. (Musaceae)		Pisang	lv		9
<i>Myristica fragrans</i> Houtt. (Myristicaceae)		Pala	lv, se	2	40
<i>Ocimum basilicum</i> L. (Lamiaceae)	ZUIS18	Kemangi merah	lv, st	1	3
<i>Orthosiphon aristatus</i> (Blume) Miq. (Lamiaceae)	ZUIS17	Kumis kucing	lv, st	2	
<i>Pandanus amaryllifolius</i> Roxb. (Pandanaceae)		Pondang	lv		3
<i>Phyllanthus niruri</i> L. (Euphorbiaceae)		Dukung anak	lv		1
<i>Piper betle</i> L. (Piperaceae)		Sirih	lv	1	3
<i>Piper cubeba</i> L.f. (Piperaceae)		Kamukus	se	2	
<i>Piper nigrum</i> L. (Piperaceae)		Rica jawa	se	2	
<i>Plantago major</i> L. (Plantaginaceae)	ZUIS10	Tosong ohat	wh	1	
<i>Plectranthus scutellarioides</i> (L.) R.Br. (Lamiaceae)		Mayana	lv, st	1	
<i>Pluchea indica</i> (L.) Less. (Asteraceae)		Malontas	lv		1
<i>Polyscias fruticosa</i> (L.) Harms (Araliaceae)	ZUIS2; ZUIS12	Sosowsow	lv, st	3	
<i>Pteris biaurita</i> L. (Pteridaceae)		Walangtindung	lv	1	
<i>Rosa</i> sp. (Rosaceae)		Bunga ros	fl		1
<i>Selaginella plana</i> Hieron. (Selaginellaceae)	ZUIS4	Ringan, Rorak	lv, st	2	
<i>Sesbania grandiflora</i> (L.) Pers. (Fabaceae)	ZUIS1	Turi	lv	1	3
<i>Syzygium aromaticum</i> (L.) Merr. & L.M. Perry (Myrtaceae)		Cengkeh	bd, lv	3	44
<i>Syzygium polyanthum</i> (Wight) Walpers (Myrtaceae)		Salam	lv	1	1
<i>Tinospora crispa</i> (L.) Hook f. & Thomson (Menispermaceae)		Tali pahit			1
<i>Zingiber montanum</i> (Koenig) Link ex Dietr. (Zingiberaceae)	ZUIS7; ZUIS14; ZUIS23	Wangeley, Goraka babi	rh	7	
<i>Zingiber officinale</i> Roscoe (Zingiberaceae)		Goraka	lv, rh	5	15
<i>Zingiber officinale</i> var. <i>rubrum</i> Theilade (Zingiberaceae)		Goraka merah	rh	1	

bd: bud; bu: bulb; fl: flower; fr: fruit; lv: leaves; rh: rhizome; se: seed; st: stalk; wh: whole plant; wo: wood.

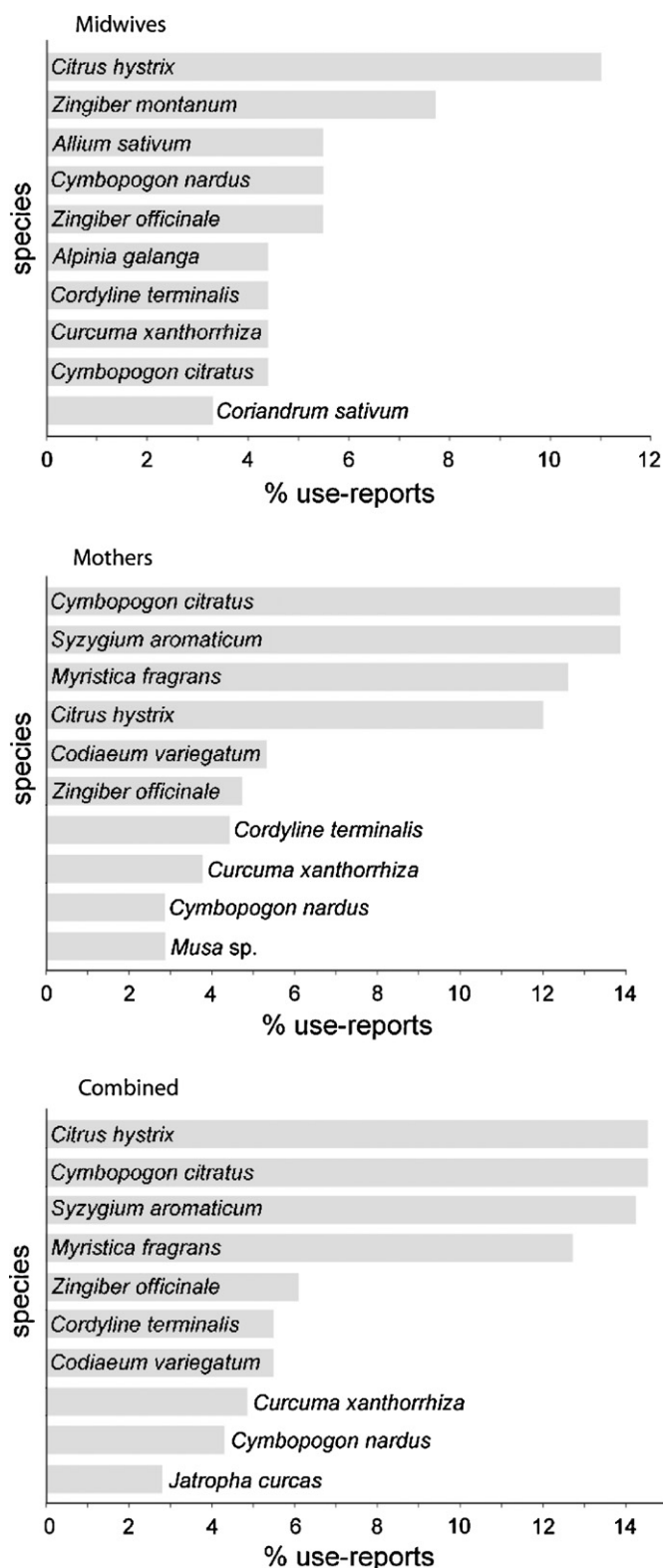


Fig. 2. The 10 most cited species among the midwives, the mothers, and in combination.

Four out of the 60 documented plants are of neotropical origin (*Annona muricata*, *Carica papaya*, *Jatropha curcas*, and *Phyllanthus niruri*). European or Eurasian flora elements are *Allium* (three species), *Apium graveolens*, *Coriandrum sativum*, *Cuminum cyminum*, *Plantago major*, and *Rosa sp.* Thus, with

20% of its species originating outside Southeast Asia, the *bakera* proves to be a preparation, which has remained flexible at all times.

A significant number of the *bakera* plants are of everyday use as common spices and fruit trees. Fig. 3 shows the multiple functionality of the *bakera* plants. From the 38 plants used by traditional midwives 50% are also used as spices in the kitchen. Among the 43 plants used by the mothers 60% are used as kitchen plants, i.e., 37% as spices and 23% as fruit trees.

5. Discussion

5.1. Effectiveness of the *bakera* and the plants used

The effectiveness of the *bakera* is based on a physiological, emotional and social aspect. Thermotherapy and aromatherapy mainly influence the physiology and emotions of the women, while the social context of the *bakera* application may also positively influence the woman's psyche. The fragrance of the plants in a relaxed atmosphere and the care taking measures of the woman's environment contribute to her general well-being.

Thermotherapy is based on thermal stimuli and subsequent cooling down (Saller and Melchart, 2002). It causes various acute, transient cardiovascular and hormonal changes, and influences people's immune and musculoskeletal systems, the respiratory tract and the antioxidant protection mechanisms (Hannuksela and Ellahham, 2001; Saller and Melchart, 2002). A study by Biro et al. (2003) shows, how thermotherapy can influence patients with congestive heart failure. Clinical symptoms such as muscular strain, heaviness in the limbs, edema, loss of appetite, and constipation are often observed due to increased peripheral vasoconstriction and reduced peripheral perfusion. Thermotherapy soothes the above-mentioned symptoms mainly by inducing vasodilatation and improves the vascular endothelial function.

Thermal stimuli with subsequent cooling are likewise characteristic of the *bakera*. Muscle fatigue, heaviness in the limbs, edema, appetite loss, and constipation are also problems of women in childbed and it can be considered that thermotherapy positively influences their recuperation.

Aromatherapy is the inhalation and external application of essential oils, which are easily absorbed into the bloodstream and excreted via the urinary system or exhaled with the breath (Maddocks-Jennings and Wilkinson, 2004). They are used for the recuperation, balance, and relaxation of body, mind and soul as well as for immune stimulation and a wide variety of health problems, such as respiratory diseases, gastroenteric diseases, nervous disorder, and bacterial and fungal infections (e.g., Alexander, 2001; Reichling et al., 2003). Furthermore, they may also show some positive side effects, acting as appetite stimulants as well as cholagogic and carminative remedies. Aromatherapy is often used in gynecology and obstetrics in Western countries (Stachowiak, 2002), for example to treat vaginal infections or to reduce maternal anxiety, fear and/or pain during labour (Burns et al., 2000).

Overall, 31 of the 60 *bakera* plants contain essential oils, and among the 10 most often mentioned species even 80% are

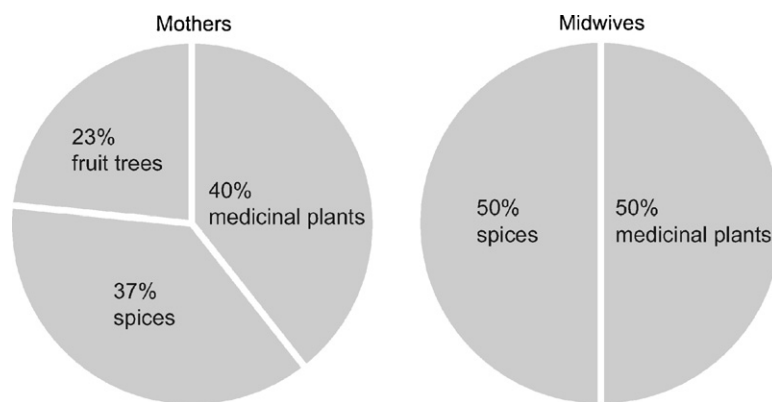


Fig. 3. Multiple functionality of *bakera* plants used by the midwives and the mothers.

essential oil plants. With the steam the essential oils are inhaled as well as applied externally on the skin, and a considerable amount may reach the bloodstream of the women (Bronaugh et al., 1990). Table 4 gives an overview of the main components of the essential oils of the most often mentioned plants and their effects. It shows that the essential oils of the *bakera* plants support recuperation mainly with their tonic effect, but they might also prevent infections due to their antiseptic and antiphlogistic properties.

5.2. Safety of the *bakera*

5.2.1. Individual state of health and the risk of inadequate applications of the *bakera*

A woman's individual state of health should determine the time of the *bakera*'s first application as well as its duration. Only women with a stable blood pressure and women who do not react negatively to high temperatures should use the *bakera*. The heat may also prove uncomfortable for women with a ruptured perineum or after an episiotomy, because the flow of sweat into such wounds may cause pain (Saller, Reinhard; Melzer, Jörg; Stähelin, Ester; Falch, Beatrix, 2005, Personal Communication).

Thermotherapy does not negatively influence the healing of wounds, but may even stimulate the excretion of the lochia (Saller, Reinhard, 2005, Personal Communication). However, women in early childbed in home confinement have to be carefully protected from any germs, which could cause puer-

peral sepsis. Early contact with people from outside can bear an additional risk and the first application of the *bakera* might be more advisable during late childbed, i.e., not before seven days after childbirth (Kuntner, Liselotte, 2006, Personal Communication).

Applications should be individualized and supervised by an experienced person, such as a local midwife. This is generally the case in Minahasa. Thus, the risk of a circulatory disorder and subsequent burning in the hot water can be minimized.

Contraindications show that thermotherapy should not be used in cases of angina pectoris, recent myocardial infarction, and severe aortic stenosis (Hannuksela and Ellahham, 2001).

5.2.2. Toxicity of the *bakera* plants

The majority of the *bakera* plants are also used in the kitchen as food and spices. They are part of the local ordinary diet and without any health risk. The excessive ingestion of certain *bakera* plants, however, such as the fresh rhizome of *Acorus calamus*, fresh leaves of *Carica papaya*, or the fruits of *Myristica fragrans*, *Piper betle*, and *Piper cubeba* may irritate the mucosa in the gastrointestinal tract or induce toxic effects (Roth et al., 1994; Hausen and Vieluf, 1997). The sap of some *bakera* plants may induce allergic skin-contact dermatitis (e.g., *Apium graveolens*, *Citrus hystrix*, *Codiaeum variegatum*, *Jatropha curcas*, *Mangifera indica*), and they need to be handled carefully.

Furocoumarins, which have been isolated from various species of the genus *Citrus*, and a certain dose of ultraviolet

Table 4

Compilation of effects produced by the essential oil of the most often used aromatic *bakera* plants

Bakera plants	Main components of the essential oil	Effect				
		Tonic	Immunostimulant	Sedative	Antiseptic	Antiphlogistic
<i>Citrus hystrix</i>	β-Pinene, Sabinene, l-citronellal	☺			☺	☺
<i>Curcuma xanthorrhiza</i>	ar-curcumene, Xanthorrhizol, β-curcumene		☺			☺
<i>Cymbopogon citratus</i>	Geranial, Neral, Limonene			☺	☺	☺
<i>Cymbopogon nardus</i>	Geraniol, Citronellal, Citronellol	☺			☺	☺
<i>Myristica fragrans</i>	α-Pinene, Sabinene, Terpinene-4-ol	☺				
<i>Syzygium aromaticum</i>	Eugenol, β-caryo-phyllene	☺			☺	
<i>Zingiber montanum</i>	Sabinene, Terpinene-4-ol	☺			☺	
<i>Zingiber officinale</i>	Zingiberene, ar-curcumene, Camphen	☺				

Sources: de Billerbeck et al. (2001); Casey et al. (1971); Dubey et al. (2000); Hänsel et al. (1999); Hwang et al. (2000); Jantan bin et al. (2003); Lawrence (2002); Oyen and Nguyen (1999); Ozaki (1990); Taroeno et al. (1991); Yamazaki et al. (1988); Zimmermann (2004).

radiation are supposed to cause a phototoxic reaction (Koh and Ong, 1999). Although the women use the *bakera* water to wash themselves and their babies, the concentration of furocoumarins in the water is probably too low to do any harm, and neither the mother nor her baby are usually exposed to direct sunlight.

5.3. Plant knowledge and practices among the midwives and the mothers

Midwives traditionally act as birth attendants and as healers and transmit their knowledge to apprentices (Lefebvre and Voorhoeve, 1998; van Eeuwijk, 1999). In Minahasa traditional midwives acquired practical experience and knowledge about medicinal plants and the *bakera* while accompanying experienced people, usually kins from the preceding generation. This explains the differences in knowledge and practices found between the midwives and the lay persons, i.e. the mothers. Although skills of using medicinal plants and preparing the *bakera* are also held and transmitted within families, the traditional midwives are considered the experts with the most experience by everybody. Midwives actually do have a broader knowledge and use more complex recipes including more medicinal plants, can indicate a reason for the use of a certain plant and also know multiple uses of it. In general, they spend more time and energy on getting the specific ingredients for the *bakera* while the mothers tend to collect the plants available in the close vicinity, i.e. in the homegardens, which results in a higher percentage of spices and fruit trees. Not surprisingly, the local people regard the midwife as authority for the *bakera* preparation and they do prefer to conduct the steam bath under her guidance.

5.4. Future use of the *bakera* in Minahasa

The *bakera* can be regarded as an effective and safe method for recuperation after child birth, if applied under the guidance of an experienced person. But, with the declining number of traditional midwives, the application of the *bakera* might also drop, since most of the local people rely on their guidance and support.

Traditional knowledge is and has always been a dynamic phenomenon in any given culture and is complex to define (Lee et al., 2001). However, changes in lifestyle have to be considered as one of the most important factors for losing an once well-known tradition if there are no efforts made to strengthen and modify it. New lifestyles of young couples who moved to the cities, and a general trend to consume Western medicine might contribute to a reduction of the *bakera* application. Some young mothers consider the preparation of the *bakera* too troublesome and find it too laborious to wait for the end of the procedure. Instead, they prefer taking a drug promoted by the mass media, which quickly alleviates their pains. The fact that all the women interviewed in Minahasa took vitamin pills or antibiotics shows that people do not hesitate to consume pharmaceuticals. On the other hand, the same women seem to have no difficulty combining traditional health care with Western medicine, which can be seen as a sign of compatibility between the two different concepts. Thus, a

dichotomous thinking of modern scientific perspective versus traditional local knowledge is not appropriate in this context (van Eeuwijk, 2000).

Of essential importance for the future use of the *bakera* are the opinions and attitudes of the professional health-care providers. The more the *bakera* is appreciated by the medical doctors the more it is valued by the mothers. The results of the present study were therefore presented to a group of medical doctors from hospitals, in order to promote the use of the *bakera* as a method for recuperation after child birth. Furthermore, handouts were prepared for the employees of the OAI in order to disseminate the traditional recipes. If the traditional knowledge is incorporated into the modern training courses for midwives, its application is supported by professional health care providers, and the traditional recipes are made available in the health centers, the *bakera* may continue to play an important role in postnatal care among the people in the Minahasa region. It is now up to the local health care providers to take decisive measures. Time will tell how the *bakera* will be influenced by recent changes in the society, whether it will be maintained or die along with the declining profession of a traditional midwife.

Acknowledgements

The successful field experiences would not have been possible without the kindness and cooperation of the people in Minahasa. Special thanks are also due to the following people for their help and support of this work: Richard Bolli and Johannes Marti (Zurich), Rolf Rutishauser (University of Zurich), Esther Stähelin (Basel and Tomohon), Peter van Eeuwijk (Universities of Basel and Zurich), Kathrin Rutishauser, and Franz Huber (Zurich), Aatje Tirie (Taratara Dua), Aba Lengkon, Lilis Pangemanan D. (UNSRAT, Manado University, Indonesian Research Institute, LIPI), Eko Baroto Walujo, Elizabeth Widjaja, Ir. Y. Purwanto, Siti Susiarti, and Arief Hidayat (University and Herbarium Bogor, LIPI), and the employees of the 'Traditional Medicine Program (OAI)' of the Health Foundation of the Protestant Church of Minahasa. We also thank Barbara Frei (University of Neuchâtel) and Christian Wagner (Basel) for pointing out some useful literature. The study was financially supported to the first author by the Stiftung zur Förderung der Pflanzenkenntnis, Basel, the Swiss Academy of Sciences, and the Baumann-Hölzle Fonds, Zurich.

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