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Ethnomedicinal study of plants used by Sheko ethnic group of Ethiopia

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ABSTRACT

Aim of the study: This study was conducted to document and evaluate knowledge on medicinal plant use by Sheko ethnic group in Southwest Ethiopia.
Materials and methods: Interviews and ranking exercises were the main methods employed to collect the ethnobotanical data. Fidelity level (FL) values were calculated for claimed Sheko medicinal plants to estimate their healing potentials.
Results: Seventy-one Sheko medicinal plants were reported, the majority of which were used to treat skin and gastro-intestinal ailments. *Ocimum lamiifolium*, *Phytolacca dodecandra*, *Amaranthus dubius* and *Amaranthus graecizans* were the medicinal plants assigned with the highest FL values, a possible indication of their better healing potential. The majority of Sheko medicinal plants were found to be herbs, and leaf was the most preferred plant part in remedy preparations. The study indicated that men, older people and illiterate ones had better knowledge of medicinal plants use as compared to women, younger people and literate ones, respectively.
Conclusions: The study showed that the Sheko people have rich knowledge of medicinal plant use. This knowledge is however, currently threatened mainly due to acculturation. Awareness should thus be created among Sheko community by concerned bodies regarding the usefulness of their medical practice. The efficacy and safety of the claimed medicinal plants need to be evaluated before recommending them for a wider use with priority given to those with high fidelity level values.

1. Introduction

Plants have traditionally been used as a source of medicine in Ethiopia since long time ago to control various ailments afflicting humans and their livestock. This is evidenced by records of several foreigners who visited the country at different times (Pankhurst and Pearson, 1972; Pankhurst, 1976). The plant-based knowledge, largely oral, has been transferred from one generation to the next through herbalists, knowledgeable elders and/or ordinary people. A study (Abebe and Hagos, 1991) indicated that about 80% of Ethiopians are still dependent on traditional medicine, which to large extent, involves the use of plants. Despite the significant role played by medicinal plants in supporting the national primary healthcare in Ethiopia (Abebe and Ayehu, 1993), very little attempt has so far been made to document and validate the associated knowledge. This rich medicinal plant knowledge is, however, seriously threatened due to deforestation, environmental degradation and acculturation, currently taking place in the country. Urgent ethnobotanical studies and subsequent conservation measures are, thus, required to prevent medicinal plants and the associated knowledge in Ethiopia from further loss. The purpose of this ethnobotanical study was to record and analyse medicinal plant knowledge of the Sheko ethnic group of Ethiopia. The Sheko people reside in Southwest Ethiopia, an area endowed with diverse and relatively intact traditional cultures and better forest cover as compared to other parts of the country.

2. Materials and methods

2.1. Study area and people

This ethnobotanical study involved the Sheko ethnic group residing in Sheko District (Wereda), Bench-Maji Zone, Southwest Ethiopia (Fig. 1). The Bench-Maji Zone is found in the Southern Nations, Nationalities and Peoples' Regional State (SNNPRS) of Ethiopia. Sheko, the administrative town of the Sheko District, is located at about 617 km southwest of the capital, Addis Ababa. According to 2007 national census report (PCC, 2008), the population of the Sheko District is 51, 195, the majority of which (37, 573) belonging to Sheko ethnic group. Sheko District is administratively divided into 24 kebeles (the smallest administrative units in Ethiopia). The District has a total area of 48,089.63 ha of land and

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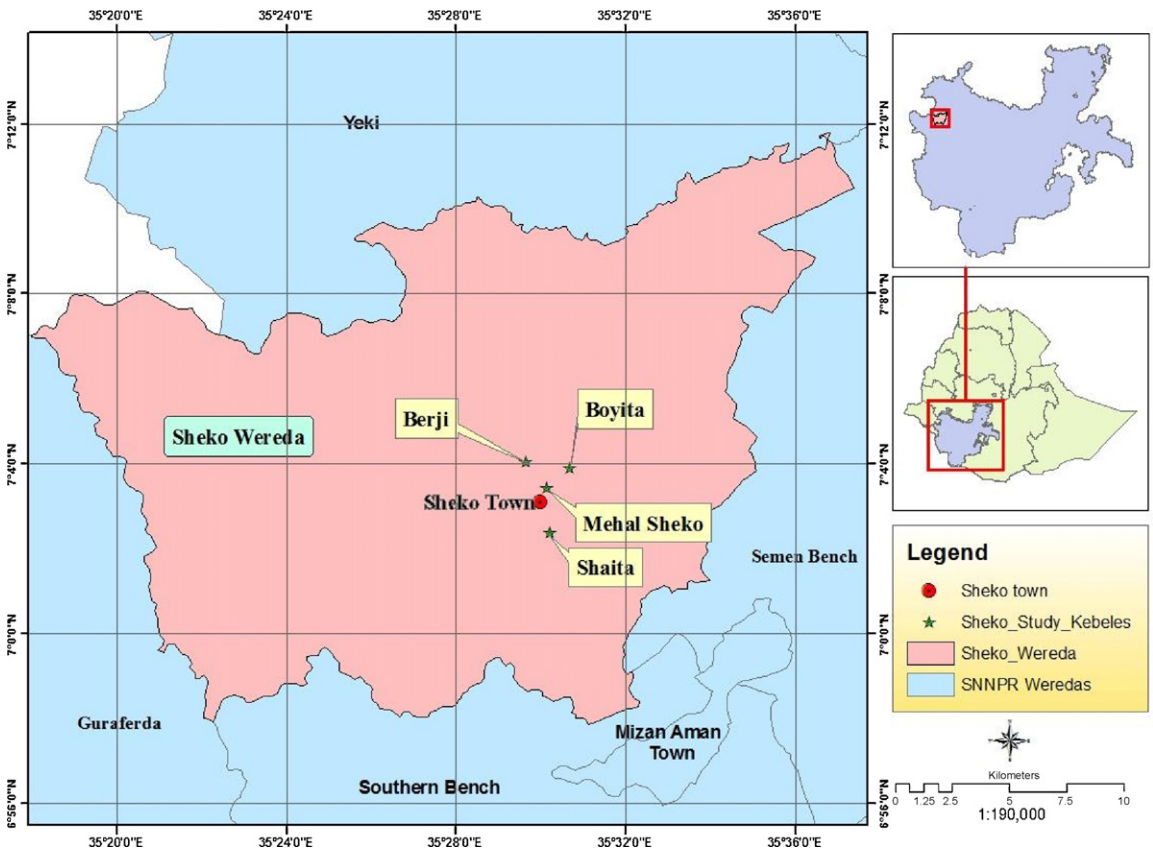

Fig. 1. Map of Sheko District showing four study kebeles.

receives an annual rainfall of 1690.2 mm (unpublished data, Sheko District Administration).

Sheko is the language of the Sheko people and belongs to the Omotic language family (EMA, 1988). The Sheko people cultivate a variety of crops such as maize, sorghum, yam, cassava, enset, taro, coffee and chat. Main staple foods of the people are sorghum, taro and maize. The Sheko also grow fruit trees such as banana, papaya, mango, avocado, orange, and spices such as 'corarima' and chilli. They also raise cattle, sheep, goat and poultry. Apiculture is also a common practice among the Sheko people.

Skin-related diseases, intestinal parasitic infections, respiratory tract infections, typhoid fever and malaria are the major public health problems afflicting the Sheko people (unpublished data, Bench-Maji Zone Health Office) and blackleg and pasteurellosis are the diseases of highest veterinary importance in the District (unpublished data, Bench-Maji Zone Agriculture Office).

2.2. Selection of study sites and informants

For the study, a total of four kebeles having different levels of access to main road/modern healthcare centres were purposively sampled. The kebeles were Mehal Sheko, Shaita, Boyita and Berji. Mehal Sheko and Shaita are found in close proximity (less than 1 km) to main road/modern healthcare centre. Boyita and Berji are located at 3–4 km distance from main road/modern healthcare centre.

The ethnobotanical survey involved 100 Sheko informants from the age of 18 and above, drawn from the four kebeles. These informants were sampled during random visits made to houses of the selected kebeles. Quota sampling approach was employed in the selection of informants to have proportional numbers of males and females. Ten more informants (five men and five women), identified as knowledgeable by local residents, were also interviewed for comparative purpose. Oral consent was obtained from people involved in the study before the start of interviews.

2.3. Methods of data collection and analysis

The ethnobotanical study was conducted between April 2004 and October 2006. Individual interview was the main method of data collection. A semi-structured interview format was developed beforehand following the approach of Martin (1995). Interviews with informants were conducted in Sheko language assisted by local translators, and responses were recorded in English.

Interview data gathered included kind of ailments treated or prevented, descriptions and local names of medicinal plants used, the plant parts harvested, ways of remedy preparations, route of remedy administrations and dosages. Information related to local trade, cultivation practices, habitat and availability of medicinal plants and potential threats was also recorded. Specimens were collected for most of the reported medicinal plants and deposited at the National Herbarium of the Addis Ababa University following drying and identification.

Data were organised and analysed by using Microsoft Excel spreadsheet software (Microsoft Corporation, 2001). One-way analysis of variance (ANOVA) tests were performed to check the existence significant differences (at 95% confidence level) between means.

The relative healing potential of each Sheko medicinal plant was estimated using an index referred to as fidelity level (FL) based on the proportion of informants who agreed on its use against a given ailment category. The formula for FL is given as $FL = I_p/I_u \times 100$, where I_p is the number of informants who independently indicated the use of a species for the same major ailment and I_u the total num-

ber of informants who mentioned the plant for any major ailment (Friedman et al., 1986).

Relative importance index (RI), indicative of the level of diversity of medical application, was computed for each reported medicinal plant by using the formula RI = NP + NCS (Bennett and Prance, 2000), where NP is obtained by dividing the number of properties (reported specific ailments) attributed to a species divided by the total number of properties attributed to the most versatile species (species with the highest number of properties). NCS is the number of body systems (ailment categories) treated by a given species divided by the total number of body systems treated by the most versatile species. Species with RI value 2.0 (the highest possible value) are those with the highest diversity of medicinal use.

Preference ranking exercises were conducted to rank six medicinal plants (*Clematis simensis*, *Echinops hoehnelii*, *Embelia schimperi*, *Garcinia buchananii*, *Microglossa pyrifolia* and *Thalictrum rhynchocarpum*) according to degree of perceived local scarcity by following the approach of Martin (1995). For the exercise, 10 informants were randomly sampled from the list of people who already participated in the interview. In this exercise, the most scarce medicinal plant was assigned with the highest number '6' and the least scarce with the least number '1'. The six plants were selected based on scarcity reports by informants during interviews and observation.

3. Results

3.1. Medicinal plants used and ailments treated

This ethnobotanical study revealed a total of 71 Sheko medicinal plant species distributed across 61 genera and 35 families, of which four (*Clematis longicauda*, *Kalanchoe petitiana*, *Milletia ferruginea* and *Pycnostachys abyssinica*) were endemic (Table 1). Asteraceae and Lamiaceae had the highest number of medicinal plants, each contributing eight species, followed by Amaranthaceae (five species) and Ranunculaceae (four species). Four families (Brassicaceae, Cucurbitaceae, Rutaceae and Solanaceae) had three species each, seven families had two species each and 20 families had one species each. Of the total species, 49 (69%) were herbs, 10 (14%) were vines, seven (10%) were trees and five (7%) were shrubs. Sixty-seven (94%) medicinal plants were reported along with their local names.

Of the total Sheko medicinal plants, 70 (98.6%) were used against human ailments and one (1.4%) to treat cattle disease known as pasteurellosis. Of the medicinal plants used against human ailments, highest proportions were used to treat skin-related disorders (26.8%), gastro-intestinal complaints (16.9%) and eye diseases (12.8%).

3.2. Plant parts used and modes of remedy preparation

Seventy three percent of the Sheko medicinal plants were harvested for their leaves and that of 20% for their roots. Other plant parts sought included the following: fruits/seeds (10%), stem/bark (7%), bulbs/rhizomes (3%), exudates (3%), flowers (<1%) and aboveground part (<1%).

Most Sheko remedies (85%) were processed and used while they were fresh while some (15%) were prepared and applied after immediate drying. Only 11% of Sheko remedies were reported to be dried and stored for future uses. The majority of remedies (57%) were administered in juice or paste form. Poultice (19%), unprocessed part (9%), decoction (8%), infusion (3%), smoke (3%) and exudate/sap (1%) were also utilized. Remedies were mostly processed using locally made mortar and pestle or grinders. Seventy percent of the Sheko remedies were prepared and administered undiluted while the rest were diluted with water (26%), coffee leaf tea (2%), milk (1%) or coffee (<1%). Concoctions were less frequently used; only 12 remedies were prepared from mixtures of different plant species.

3.3. Routes of remedy administration and dosage

Of the Sheko remedies, 37% were applied cutaneously and 34% were taken orally. Some proportions of medicinal plants were taken through the following routes: ocular (9%), nasal (7%) and auricular (6%) or locally applied in the mouth or on the tongue or tooth (6%). One remedy (<1%) was reported to be kept in a house to repel snakes.

Most treatments did not take more than 2 days. Some treatments were, however, indicated to take from 3 to 8 days and few were subscribed until cure. The majority of remedies were administered once a day. Type and severity level of ailment and patient age were among the factors considered in dosage determination. When patients did not show any improvement after the completion of treatments with herbal remedies, they were taken to nearby modern health centres. Restrictions were imposed in the use of some remedies and precautionary measures were taken in the handling of few others. For example, one Sheko informant reported that a taenicide prepared from fruits of *Embelia schimperi* should not be given to children under the age of 15 because of its adverse effect. The same informant further reported that remedy prepared from the same taenicidal plant had to be taken on empty stomach and meal should not be taken until the proglottids were expelled. Another Sheko informant warned that latex of *Euphorbia ampliphylla*, used to destroy warts, should be handled with care during treatment because of its serious damage on eyes upon contact.

3.4. Estimation of medicinal plant healing potential and use-diversity

Of the Sheko medicinal plants, *Ocimum lamiifolium* (against MICHI), *Phytolacca dodecandra* (against rabies) and *Amaranthus dubius* and *Amaranthus graecizans* (both against skeleto-muscular disease) came out with the highest FL values (Table 2).

Further analysis of the interview data indicated *Leucas deflexa* as the Sheko medicinal plant with the highest relative importance (RI) value (2.0), followed by *Dicrocephala integrifolia* (1.9) (Table 3). *Leucas deflexa* was locally used against abdominal cramp, ascariasis, diarrhoea, tinea corporis and muscle twist. It was also recommended as an antidote and repellent against snakebites. *Dicrocephala integrifolia* was used to treat knee swelling, skin-cut infection, bone fracture, backbone pain, cataract and other eye infections.

3.5. Distribution of medicinal plant knowledge within the Sheko community

On average, significantly higher ($p < 0.05$) numbers of medicinal plants were claimed by men than women, by informants of age group between 18 and 40 years than those above 40 and by illiterate informants than literate ones (Table 4). Significant differences ($p < 0.05$) was also observed between the average numbers of medicinal plants cited by informants identified as knowledgeable by locals and those encountered during random visits made to houses in the selected kebeles. Knowledge of medicinal plants between Sheko informants who lived near roads and health centres (at less than 1 km distance) and those who resided far away from roads and health centres (at more than 3 km distance) was also compared but no significant difference ($p > 0.05$) was observed between the average numbers of medicinal plants reported by the two groups of informants.

Table 1
List of Sheko medicinal plants.

Scientific[a] and family names	Local name	Growth form	Ailment treated[b]	Part used	Administration route	Mixed with	Voucher no.
1. *Achyranthes aspera* L., Amaranthaceae	ziadu-boee	Herb	Wound	Leaf	Topical		MG-S88-2006
2. *Achyrospermum schimperi* (Briq.) Perkins, Lamiaceae	kursi-charo	Herb	Boil	Leaf	Topical		MG-S78-2005
3. *Acmella caulirhiza* Delile, Asteraceae	guticha	Scrambler	Tonsillitis	Flower	Local (throat), topical		MG-S9-2004
4. *Adenostemma perrottetii* DC., Asteraceae	bo-charo, shoj-charo	Herb	Dysentery	Stem	Oral		MG-S60-2005
			Snakebite	Leaf	Oral		MG-S55-2005
5. *Ageratum conyzoides* L., Asteraceae	zingube-qumbe	Herb	Back bone pain	Leaf	Topical	8, 30	MG-S65-2005
6. *Ajuga integrifolia* Buch.-Ham., Lamiaceae	kursi-charo	Trailing herb	Wound	Leaf	Topical	1	MG-S21-2004
			Boil	Leaf	Topical	31	
			Amoebiasis	Leaf	Oral		
7. *Allium sativum* L., Alliaceae	nech-shinkurt	Herb	Headache	Bulb	Oral	14, 26, 71	–
			Headache	Bulb	Oral	15, 26	
8. *Amaranthus dubius* Mart. ex Thell., Amaranthaceae	mezi	Herb	Chest bone fracture (child)	Leaf	Topical		MG-S63-2005
			Back bone pain	Leaf	Topical	5, 30	
9. *Amaranthus graecizans* L., Amaranthaceae	mezi	Herb	Bone fracture, dislocation	Leaf	Topical	30	MG-S25-2004
			Chest bone fracture (child)	Leaf	Topical		
10. *Aspilia mossambicensis* (Oliv.) Wild, Asteraceae	kershu	Herb	Ear infection	Leaf	Local (ear)		MG-S45-2005
11. *Brassica carinata* A.Braun, Brassicaceae	koza	Herb	Gastritis	Leaf	Oral		MG-S76-2005
12. *Brassica nigra* (L.) W.D.J.Koch, Brassicaceae	–	Herb	Stomachache	Seed	Oral		–
13. *Capparis erythrocarpos* Isert, Capparidaceae	buda-charo	Climber	Evil eye	Root	Fumigation		MG-S58a-2005
			Boil	Root	Topical		MG-S58a-2005
14. *Capsicum annuum* L., Solanaceae	berbere	Herb	Headache	Fruit	Oral	7, 26, 71	–
15. *Capsicum frutescens* L., Solanaceae	mitmita	Herb	Headache	Fruit	Oral	7, 26	–
16. *Cardamine trichocarpa* Hochst. ex A.Rich., Brassicaceae	koshkin	Climber	Boil	Leaf	Topical	47	MG-S82-2005
17. *Cayratia gracilis* (Guill. & Perr.) Suess., Vitaceae	–	Climber	Wound	Root	Topical		MG-S89-2006
18. *Celosia anthelminthica* Aschers., Amaranthaceae	–	Herb	Taeniasis	Leaf	Oral		MG-S90-2006
19. *Celosia trigyna* L., Amaranthaceae	yazinti	Herb	Taeniasis	Leaf	Oral	27	MG-S67-2005
20. *Centella asiatica* (L.) Urb., Apiaceae	yetinti-charo	Herb	Genital infection	Leaf	Topical		MG-S59-2005
			Lymphadenitis	Leaf	Topical		
21. *Chenopodium opulifolium* Schrad. ex W.D.J.Koch & Ziz., Chenopodiaceae	tsora	Herb	Ear infection	Leaf	Local (ear)		MG-S38-2005
22. *Clausena anisata* (Willd.) Hook. f. ex Benth., Rutaceae	etunisha	Tree	Evil eye	Leaf	Nasal		MG-S91-2006
23. ***Clematis longicauda*** Steud. ex A.Rich., Ranunculaceae	zina-charo, wusho-charo	Climber	Itching skin	Leaf, stem	Topical		MG-S7-2004
			Toothache	Leaf	Local (tooth)		
			Wound	Leaf	Topical		
24. *Clematis simensis* Fresen., Ranunculaceae	biyaqin-charo	Climber	Wound	Leaf	Topical		MG-S48-2005
	tsuqign-charo		Eye infection	Leaf	Local (eye)		
25. *Cleome strigosa* Oliv., Cleomaceae	ejigora	Herb	Ear ache	Leaf	Local (ear)		MG-S86-2006
26. *Coffea arabica* L., Rubiaceae	jeno, jenuai	Tree	Headache	Leaf	Oral	7, 14, 71	–
			Headache	Leaf	Oral	7, 15	

27. *Cucurbita pepo* L., Cucurbitaceae	duba-fire	Climber	Taeniasis	Seed	Oral	19	–
28. *Cynoglossum amplifolium* Hochst. ex DC., Boraginaceae	ay-charo, pitsi-charo	Herb	Ear infection	Leaf	Local (ear)		MG-S33-2005
			Arthritis	Leaf	Topical		
29. *Cynoglossum* sp., Boraginaceae	aye-charo	Herb	Ear infection	Leaf	Local (ear)		MG-S16-2004
30. *Dicrocephala integrifolia* (L.f.) Kuntze, Asteraceae	biaqin-charo, tsuqign-charo, mezi, titi-charo	Herb	Wound	Leaf	Topical		MG-S24-2004
			Cataract	Leaf, stem	Local (eye)		
			Bone fracture, dislocation	Leaf	Topical	9	
			Arthritis	Leaf	Topical		
			Back bone pain	Leaf	Topical	5, 8	
			Eye infection	Leaf	Local (eye)		
31. *Dyschoriste nagchana* (Nees) Bennet, Acanthaceae	zoma-charo, kursi-charo	Herb	Eye infection	Leaf	Local (eye)	33	MG-S40-2005
			Boil	Leaf	Topical	6	
32. *Dracaena steudneri* Engl., Dracaenaceae	atsu	Herb	Rabies	Leaf	Oral	55, 65	MG-S57-2005
33. *Drymaria cordata* (L.) Willd. ex Roem. & Schult., Caryophyllaceae	pitsi-charo, zoma-charo	Herb	Arthritis	Leaf, above ground	Topical		MG-S30-2005
			Eye infection	Leaf	Local (eye)	31	
34. *Echinops hoehnelii* Schweinf., Asteraceae	qeber	Herb	Malaria	Root	Oral		MG-S72-2005
			Snakebite	Root	Oral		
35. *Embelia schimperi* Vatke, Myrsinaceae	qoqu	Shrub	Taeniasis	Fruit, root	Oral		MG-S2-2004
			Ascariasis	Fruit, root	Oral		
36. *Ensete ventricosum* (Welw.) Cheesman, Musaceae	odu	Herb	Bone fracture	Root	Oral		–
37. *Euphorbia ampliphylla* Pax, Euphorbiaceae	kedi	Tree	Wart	Sap	Topical		MG-S92-2006
38. *Garcinia buchananii* Baker, Clusiaceae	chatu	Tree	Ascariasis	Fruit	Oral		MG-S66-2005
39. *Gouania longispicata* Engl., Rhamnaceae	fucha	Herb	Oral thresh	Stem exudate	Local (tongue)		MG-S-82-2005
40. *Hydrocotyle mannii* Hook.f., Apiaceae	tsuqign-charo	Herb	Eye infection	Leaf	Local (eye)		MG-S74-2005
41. ***Kalanchoe petitiana*** A.Rich., Crassulaceae	oshka-charo	Herb	Itching skin	Root	Topical		MG-S87-2006
42. *Lantana camara* L., Verbenaceae	michi-charo	Shrub	Michi[c]	Leaf	Topical (face)		MG-S93-2006
43. *Leucas deflexa* Hook.f., Lamiaceae	mezi, wonchi, tsirqu-charo, shota-charo, shonku-charo, bequtsa-charo, shoj-charo, tijgara	Herb	Diarrhea	Leaf	Oral		MG-S17-2004
			Joint dislocation	Leaf	Topical		
			Tinea corporis	Leaf	Topical		
			Abdominal cramp	Leaf, root	Oral		
			Snake repellent	Leaf	Keep it in house		
			Snakebite	Leaf	Local (tongue)		
			Ascariasis	Leaf	Oral		
44. *Marantochloa leucantha* (K.Schum.) Milne-Redh., Marantaceae	zuka	Herb	Gonorrhoea	Leaf, root	Oral		MG-S83-2005
45. *Microglossa pyrifolia* (Lam.) Kuntze, Asteraceae	yemariam-meqenet, yatinti-charo, beka, yeshererit-medhanit	Shrub	Jaundice	Leaf	Oral		MG-S13-2004
			Herpes	Leaf	Topical		
46. ***Millettia ferruginea*** (Hochst.) Baker, Fabaceae	ziyagu	Tree	Wound	Stem bark	Topical	47	MG-S94-2006
47. *Momordica foetida* Schumach., Cucurbitaceae	shishu	Climber	Wound	Leaf	Topical	46	MG-S77-2005
			Ear infection	Leaf	Local (ear)	50	
			Nosebleed	Leaf	Local (nose)		
			Boil	Leaf	Topical	39	

Table 1 (*Continued*)

Scientific[a] and family names	Local name	Growth form	Ailment treated[b]	Part used	Administration route	Mixed with	Voucher no.
48. *Ocimum basilicum* L., Lamiaceae	bisbir	Herb	Cold	Leaf	Oral		–
49. *Ocimum lamiifolium* Hochst. ex Benth., Lamiaceae	michi-charo, dema-kese	Herb	MICHI	Leaf	Nasal, topical (face), oral		MG-S46-2005
50. *Ocimum urticifolium* Roth, Lamiaceae	eyafa, baken-charo, gequ-kuqu	Herb	Toothache	Leaf Seed	Local (tooth)		MG-S73-2005
			Oral thresh	Leaf	Local (tongue)		
			Ear infection	Leaf	Local (ear)	47	
			Mouth infection (child)	Leaf	Local (mouth)		
			Tongue infection	Leaf	Local (tongue)		
51. *Oxalis corniculata* L., Oxalidaceae	pitsi-charo	Herb	Arthritis	Leaf	Topical		MG-S95-2006
52. *Oxalis radicosa* A.Rich., Oxalidaceae	pitsi-charo	Herb	Arthritis	Leaf	Topical		MG-S69-2005
53. *Pentas lanceolata* (Forssk.) Deflers, Rubiaceae	jamto, dori-charo, jamto	Herb	Urinary tract infection	Root	Oral		MG-S70-2005
			Retained placenta	Root	Oral		
54. *Phyllanthus pseudoniruri* Müll.Arg., Euphorbiaceae	kabsiri	Herb	Evil eye	Leaf	Topical	69	MG-S68-2005
55. *Phytolacca dodecandra* L'Hér., Phytolaccaceae	shorshu, kiano-charo	Shrub	Rabies	Root	Oral	32, 65	MG-S4-2004
56. ***Pycnostachys abyssinica*** Fresen., Lamiaceae	bumbu	Herb	Headache	Leaf	Topical (head)	68	MG-S34-2005
57. *Ranunculus oreophytus* Delile, Ranunculaceae	tsukign-charo	Herb	Eye infection	Leaf	Local (eye)		MG-S71-2005
58. *Ritchiea albersii* Gilg, Capparidaceae	gemtuw	Herb	Cataract	Leaf	Local (eye)		MG-S96-2006
59. *Rumex nepalensis* Spreng., Polygonaceae	girshu, gorengoch, bacharu	Herb	Abdominal cramp	Root	Oral		MG-S97-2006
			Ear infection	Leaf	Local (ear)		
			Diarrhea	Root, leaf	Oral		
60. *Ruta chalepensis* L., Rutaceae	tserti	Herb	Headache	Leaf	Oral		–
			Cold	Leaf	Oral		
61. *Salvia nilotica* Juss. ex Jacq., Lamiaceae	samba	Herb	Lymphadenitis	Leaf	Oral		MG-S10-2004
62. *Snowdenia polystachya* (Fresen.) Pilg., Poaceae	gerdu	Grass	Pasteurellosis (cattle)	Leaf, stem	Nasal		MG-S75-2005
63. *Solanum dasyphyllum* Schumach. & Thonn., Solanaceae	tliqu-imbuay	Shrub	Nosebleed	Leaf	Local (nose)		MG-S14-2004
64. *Stellaria sennii* Chiov., Caryophyllaceae	setbay	Climber	Eye infection	Leaf	Local (eye)		MG-S51-2005
65. *Stephania abyssinica* (Quart.-Dill. & A.Rich.) Walp., Menispermaceae	kuda	Climber	Rabies	Leaf	Oral	32, 55	MG-S53-2005
66. *Thalictrum rhynchocarpum* Quart.-Dill. & A.Rich., Ranunculaceae	dori-charo	Herb	Urinary tract infection	Root	Oral		MG-S43-2005
67. *Vepris dainellii* (Pic.-Serm.) Kokwaro, Rutaceae	jemshi	Tree	Boil	Root	Topical		MG-S98-2006
68. *Vernonia amygdalina* Delile, Asteraceae	beka	Tree	Headache	Leaf	Topical (head)	56	MG-S36-2005
69. *Veronica abyssinica* Fresen., Scrophulariaceae	chazi-ziama	Herb	Evil eye	Leaf	Topical	54	MG-S61-2005
70. *Zehneria scabra* (L.f.) Sond., Cucurbitaceae	–	Climber	Malaria	Root	Oral		MG-S99-2006
71. *Zingiber officinale* Roscoe, Zingiberaceae	zingibil	Herb	Headache	Rhizome	Oral	7, 14, 26	

[a] Scientific names of medicinal plants endemic to Ethiopia are written in bold font.

[b] Unless specified, the given disease is that of humans.

[c] It is a type of febrle illness.

Table 2
Fidelity level (FL) values for Sheko medicinal plants cited by three or more informants for being used against a given ailment category.

Medicinal plant	Ailment	I_p	I_u	FL value (%)
Ocimum lamiifolium	MICHI	7	7	100
Phytolacca dodecandra	Rabies	4	4	100
Amaranthus dubius	Skeleto-muscular diseases	3	3	100
Amaranthus graecizans	Skeleto-muscular diseases	3	3	100
Ocimum urticifolium	Oro-dental and pharyngeal disease	6	7	86
Rumex nepalensis	Gastro-intestinal complaints	5	6	83
Celosia trigyna	Gastro-intestinal complaints	3	4	75
Embelia schimperi	Gastro-intestinal complaints	3	4	75
Microglossa pyrifolia	Cutaneous/subcutaneous disease	3	4	75
Drymaria cordata	Arthritis	3	5	60
Momordica foetida	Cutaneous/subcutaneous disease	3	5	60
Dicrocephala integrifolia	Eye disease	6	12	50
Ajuga integrifolia	Gastro-intestinal complaints	3	6	50
Leucas deflexa	Gastro-intestinal complaints	4	10	40
Leucas deflexa	Skeleto-muscular disease	3	10	30

3.6. Trade, habitat and abundance of reported medicinal plants

The majority of Sheko medicinal plants were not sold at local markets as they could be harvested freely from the immediate environment. Only 14 (*Allium sativum*, *Brassica carinata*, *Brassica nigra*, *Capsicum annuum*, *Capsicum frutescens*, *Clausena anisata*, *Coffee arabica*, *Cucurbita pepo*, *Embelia schimperi*, *Ensete ventricosum*, *Garcinia buchananii*, *Ocimum basilicum*, *Ruta chalepensis* and *Zingiber officinale*) were found to be sold at local markets, and all except one were sold for their non-medicinal uses. *Embelia schimperi* was the only species sold for its sole medicinal purpose.

Eighty-three percent of the Sheko medicinal plants were reported to be uncultivated ones largely growing in disturbed habitats, mainly in crop fields (28%) and fallowlands (23%). Some uncultivated plants were revealed to occupy the following habitats: live fence (65), forest margin (6%), roadside (5%), homegarden (5%), riverside 94%), forest (4%) and rocky area (2%). Only 17% of the medicinal plants were found to be cultivated in homegardens (14%) and cultivation fields (3%), most of which grown primarily for other purposes. *Ocimum lamiifolium* was the only species that was occasionally cultivated in homegardens primarily for its medicinal value.

Favoured by the ever-increasing habitat disturbance, the abundance of most Sheko medicinal plants was reported to have even been increasing during the past years due to their weedy nature. It was, however, revealed that populations of three Sheko medicinal plants (*Millettia ferruginea*, *Thalictrum rhychocarpum* and *Microglossa pyrifolia*) were declining from time to time due to selective cutting and/or deforestation. Result of preference ranking exercises conducted on six selected medicinal plants revealed *Garcinia buchananii*, *Microglossa pyrifolia* and *Embelia schimperi* as the most scarce ones (Table 5).

Table 3
Relative importance (RI) values for Sheko medicinal plants used against three or more specific ailments.

Scientific name	NP	NCS	RI value
Leucas deflexa	1	1	2.0
Dicrocephala integrifolia	0.9	1	1.9
Momordica foetida	0.6	0.8	1.4
Ajuga integrifolia	0.6	0.5	1.1
Ocimum urticifolium	0.6	0.5	1.1
Amaranthus dubius	0.4	0.5	0.9
Rumex nepalensis	0.4	0.5	0.9
Clematis longicauda	0.4	0.3	0.7

3.7. Traditional medical practices and beliefs

Large number of informants reported that most ailments were treated at a household level. But people, when found necessary, could consult other knowledgeable people in their respective local community with little or no charge. Eighty percent of the interviewees responded that they kept their medicinal plant knowledge secret. There was high agreement among informants that transfer of knowledge to people outside the family circle took place on substantial payment. Most informants reported that knowledge was formally transferred along the family line and mainly through sons.

Remedy preparations often involved some sort of spiritual or ritual procedures. According to one Sheko informant, for example, for rabies treatment, the patient had to physically see *Stephania abyssinica* before taking remedy prepared from roots of *Phytolacca dodecandra*. Another Sheko informant reported that during treatment a cross sign had to be made on the forehead of a patient suffering from evil eye possession with leaf paste of *Phyllanthus pseudoniruri*.

Eighty-eight percent of informants reported that vertical transfer of medicinal plant knowledge was not taking place effectively, unlike it was before, due to lack of interest by the younger generation to learn and practice it mainly due to acculturation. It was also revealed that some informants ceased to practice traditional medicine due to the increasing availability of allopathic medicines.

Table 4
Comparison of the average numbers of medicinal plants reported by different informant groups.

Informant categories	*n*	Average ± S.D.
Sex*		
Male	55	1.9 ± 0.002
Female	55	0.8 ± 0.001
Age*		
18–40 years	79	1.1 ± 0.003
>40 years	31	2.0 ± 0.02
Education*		
Illiterate	83	2.6 ± 0.02
Literate	27	1.0 ± 0.004
Informants*		
Identified as knowledgeable	10	3.6 ± 0.02
Encountered during random visits to houses	100	1.2 ± 0.02
Informants		
Residing at < 1 km distance from roads/healthcare centres	54	1.3 ± 0.03
Residing at > 3 km distance from roads/healthcare centres	56	1.5 ± 0.003

* Significant difference ($p < 0.05$) between averages of the paired categories.

Table 5
Ranking of six Sheko medicinal plants using the procedure of preference ranking based on their degree of local scarcity (plant with the highest score is the most scarce one).

Medicinal plant name	Informants (coded A to J)										Total score	Ranking
	A	B	C	D	E	F	G	H	I	J		
Clematis simensis	3	4	4	4	3	2	4	3	5	3	35	4th
Echinops hoehnellii	2	2	1	2	2	1	3	1	1	1	15	6th
Embelia schimperi	4	3	3	5	5	4	2	6	3	2	37	3rd
Garcinia buchananii	6	5	6	6	6	5	6	4	6	5	55	1st
Microglossa pyrifolia	5	6	5	3	4	6	5	5	4	6	49	2nd
Thalictrum rhynchocarpum	1	1	2	1	1	3	1	2	2	4	18	5th

4. Discussion and conclusion

The study showed high diversity of plant use by the Sheko people in treating different types of ailments which could be an indication of the significant role of plant-based traditional medicine in meeting the basic healthcare needs of the people. Good vegetation cover, acceptance of traditional medicine and limited access to modern healthcare facilities could be among the factors that have contributed to the continued reliance of the Sheko people on local medicinal plants and traditional medical practice.

The relatively higher contribution of medicinal plants by Asteraceae and Lamiaceae as compared to other families could probably be attributed to their species richness. Asteraceae, Lamiaceae are among the largest dicotyledoneous families in the flora of Ethiopia and Eritrea containing about 630 species (Tadesse, 2004) and 440 species (Ryding, 2006), respectively. The fact that the two families are relatively rich in medicinal plant species might also reflect their richness in some active principles. Similar studies conducted elsewhere in Ethiopia (Tadesse et al., 2005; Giday et al., 2009) also revealed the high contribution of these families to the medicinal flora of the country.

The frequent use of herbaceous species among the Sheko community could be a result of their relative abundance as compared to trees and shrubs as also witnessed by investigators of this study. The study area remains very humid for most months of the year creating favourable condition for the growth of herbs. The common use of herbs as sources of medicine were also indicated by studies conducted in Ethiopia (Giday et al., 2003, 2007; Wondimu et al., 2007; Yineger et al., 2007) and elsewhere in the world (Tabuti et al., 2003; Muthu et al., 2006; Uniyal et al., 2006).

The reason why relatively higher number of medicinal plants was used by the Sheko people to treat skin-related ailments and gastro-intestinal complaints could be related to the high prevalence of these disorders in the study area. Skin-related disorders and gastro-intestinal complaints were reported to be among the diseases in Bench-Maji Zone that are known for their high morbidity (unpublished data, Bench-Maji Zone Health Office).

Literature survey indicated the same or similar use of some Sheko medicinal plants by people elsewhere. Medicinal plants that were reported at least three times for being used elsewhere against the same ailment include *Achyranthes aspera* (used against wound) (Giday et al., 2003; Balemie et al., 2004; Muthu et al., 2006; Sajem and Gosai, 2006), *Embelia schimperi* (used against taeniasis) (Wolde and Gebre-Mariam, 2002; Abera, 2003; Giday et al., 2009) and *Phytolacca dodecandra* (used against rabies) (Addis et al., 2001; Abera, 2003; Giday and Ameni, 2003). The fact that medicinal plants are being used for the same purpose by more than one community might indicate their pharmacological effectiveness.

The common use of leaf by the Sheko people in the preparation of remedies could partly be related to the relative ease of finding and collecting this plant part over an extended period of time as compared to others. Many communities elsewhere also predominantly use leaves in the preparation of remedies (Abera, 2003; Wassihun et al., 2003; Kala, 2005; Tadesse et al., 2005; Ignacimuthu et al., 2006; Muthu et al., 2006; Yineger and Yewhalaw, 2007; Yineger et al., 2008).

Remedies in the study area are mostly prepared from newly harvested plant parts. There is little tradition of storing parts for future uses which could be indicative of the availability of copious plant materials in the vicinity to be picked any time of the year. Studies conducted elsewhere (Giday et al., 2003; Giday and Ameni, 2003; Bussmann and Sharon, 2006; Ignacimuthu et al., 2006) also revealed the frequent use of fresh materials. Fresh materials are also preferred to dried ones when they contain volatile oils, the concentration of which could deteriorate on drying. Some communities in Ethiopia, were, however, reported to have the habit of drying and storing plant materials that could not adequately be available all year round (Abebe, 1984; Balemie et al., 2004).

The majority of Sheko remedies are taken in juice or paste forms, which is also a common practice elsewhere (Giday et al., 2003; Giday and Ameni, 2003; Ignacimuthu et al., 2006; Kunwar et al., 2006; Muthu et al., 2006; Seifu et al., 2006). The majority of Sheko remedies are prepared from single plant species which is in agreement with results of some studies conducted elsewhere in Ethiopia (Abera, 2003; Balemie et al., 2004; Hunde et al., 2004) and other parts of the world (Milliken and Albert, 1996; Ignacimuthu et al., 2006; Muthu et al., 2006). Some other reports, however, indicated the fairly common use of concoctions in Ethiopia (Abebe, 1984, 1986; Yineger and Yewhalaw, 2007) and elsewhere in the world (Lal and Yadav, 1983; Kamatenesi-Mugisha, 2003). The frequent use of concoctions could be attributed to the belief by many healers of synergic reactions where one plant could have a potentiating effect over the other (Lal and Yadav, 1983; Abebe and Ayehu, 1993). It was, however, also noted that healers may intentionally use poly-herbal prescriptions to mask the potent plant which could, sometimes, lead to unwanted side effects (Addis et al., 2001).

Interview and observation results indicated that only few Sheko medicinal plants were traded at local markets. There is little market demand for medicinal plants in the study area as they are abundantly found in the immediate environment of users. Results of other studies conducted in Ethiopia, however, revealed wide domestic trade of medicinal plants (Kloos, 1976/1977; Kloos et al., 1978; Dessissa, 2001). Medicinal plants that are traded in Ethiopia primarily for their medicinal purposes, among others, include *Hagenia abyssinica*, *Embelia schimperi*, *Glinus lotoides*, *Silene macroselen* and *Withania somnifera* (Kloos et al., 1978). In contrast to some developing countries, there is no official report, so far, of any medicinal plant export from Ethiopia. The Food and Agricultural Organisation (FAO) estimated that worldwide between 4000 and 6000 species of medicinal plants are traded (Tuxill, 1999).

The majority of medicinal plants used in the study area are weedy species that commonly grow in crop fields, fallowlands, homegardens and roadsides. A similar finding reported by Fassil (2003) revealed the common use of weedy plants by people residing in the rural Bahir Dar Zuria district, Northwestern Ethiopia, in the preparation of remedies. Gazzaneo et al. (2005) also reported that many of the medicinal plants used by herbalists in Igarassu community, Pernambuco State, Brazil, are weeds harvested from back yards and small farms. According to Voeks (2004), weeds are

often abundant near at hand, easy to harvest and are frequently rich in bioactive compounds and as a result they are amply represented in contemporary tropical healing floras. Results of individual interviews, ranking exercises and observation indicated that *Garcinia buchananii* and *Embelia schimperi* are the most scarce Sheko medicinal plants mainly due to deforestation and/or selective cutting.

The Sheko plants *Ocimum lamiifolium* (used against MICHI), *Phytolacca dodecandra* (used against rabies) and *Amaranthus dubius* and *Amaranthus graecizans* (both used against skeleton-muscular diseases) had the highest FL values and this could be an indication of their good healing potential. Trotter and Logan (1986) stated that plants which are used in some repetitive fashion are more likely to be biologically active. Results of studies conducted elsewhere indicated the antimicrobial properties of *Ocimum lamiifolium* and taenicidal and molluscicidal properties of *Phytolacca dodecandra* (Abegaz and Dagne, 1978; Haile Meskel, 1994; Abebe et al., 2003). Different active ingredients have also been isolated by researchers elsewhere from *Ocimum lamiifolium* (eugenol) and *Phytolacca dodecandra* (tannin, saponin, alkaloid, and volatile oil (Abebe and Hagos, 1991; Abebe et al., 2003). The fact that the Sheko medicinal plants *Leucas deflexa* and *Dicrocephala integrifolia* have high RI values could partly be a reflection of their abundance in the study area. High RI value could also indicate higher diversity of active compounds contained by the species.

Results showed that men have better medicinal plant knowledge as compared to women which could probably be due to the fact that boys are usually selected in the study area for the proper transfer of the knowledge. Other studies conducted elsewhere demonstrated similar results (Tesfu et al., 1995; Begossi et al., 2002; Collins et al., 2006; Teklehaymanot, 2009). Gedif and Hahn (2002) wrote that parents in Ethiopia prefer to pass their traditional medical knowledge more to sons than to daughters. However, a study conducted by Fassil (2003) in the rural Bahir Dar Zuria district, Northwestern Ethiopia, demonstrated that there is no significant difference in medicinal plant knowledge between men and women.

The study indicated that younger people in the study area have less medicinal plant knowledge as compared to older ones, which could be attributed to the lack of interest from the younger generation to learn and practice it due to the ever-increasing influence of modernization. Many studies conducted elsewhere revealed similar findings (Hilgert, 2001; Begossi et al., 2002; Fassil, 2003; Gedif and Hahn, 2003; Hunde et al., 2004; Uniyal et al., 2006; Teklehaymanot, 2009). A study by Hunde et al. (2004) indicated that none of the young people in Boosat District of Ethiopia has continued to practice traditional medicine. Result of a study conducted in India (Uniyal et al., 2006) also indicated that information on the medicinal uses of plants nowadays seems to have mostly been confined to older people (above 40 years of age).

Literate people in the study area reported less number of medicinal plants as compared to illiterate ones which could probably be due to higher influence of modernization on the former. Other studies conducted elsewhere also reported similar results (Wester and Yongvanit, 1995; Gedif and Hahn, 2003).

Significant difference was not observed in medicinal plant knowledge between informants in the study area residing at varying distances from health centres and roads. This could be due to the fact that the study site which was assumed to be far from main road/healthcare facilities was not far enough to prohibit or discourage people from visiting nearby modern healthcare centres. Studies conducted elsewhere, however, reported a positive relationship between distance and the local knowledge (Wayland, 2001; Vandebroek et al., 2004; Bussmann et al., 2006).

It was learnt that traditional medicine among the Sheko has been practiced by non-specialist men and women farmers. Many ailments have been diagnosed and treated at household or family level although there was room for people to also seek the help of other people in their respective communities. The fact that most treatments are given at a household level was also reflected in the findings of other works (Fassil, 2003; Deribe et al., 2006). The majority of the Sheko informants reported that they keep their medicinal plant knowledge secret, its free exchange taking place only within family members. Most informants think that they could lose their income and respect if they reveal their knowledge to other people in the area. Secrecy in traditional medical practice is also a frequent phenomenon in different parts of the country (Gedif and Hahn, 2002; Balemie et al., 2004; Giday et al., 2009). It was also learnt that transfer of the knowledge among the Sheko community has mainly been taking place vertically from father/mother to child (mainly a son) which is in agreement with the result of a study carried out elsewhere in the country (Deribe et al., 2006).

The immediate and serious threat to the local medical practice in the study area seems to have come from the increasing influence of modernization. As there is no adequate modern healthcare service provision in the study area, loss of local medical knowledge and practice could negatively affect the healthcare system of the people. There is, however, a potential threat to the medicinal flora of the area as a result of the increasing trend of using herbicides and the diminishing size of plots left as fallowlands.

The efficacy and safety of all the claimed medicinal plants need to be evaluated through pharmaco-chemical studies. Priority to conduct bioassay and toxicity tests should, however, be given to medicinal plants that came out with the highest FL values. Effort should also be made by concerned bodies to communicate results of any future studies on the efficacy and safety of the documented medicinal plants back to the owners of the knowledge. Such measure is expected to help in boosting the confidence of the people on their traditional medical knowledge and thereby encourage them to conserve their medicinal plants.

More and more people, especially the youth, in the study area are abandoning traditional medical practice mainly due to acculturation. To curb or slowdown this trend, awareness has to be created through different means among members of the communities in the area about the usefulness of the knowledge and practice by concerned governmental and non-governmental organisations and individuals. Youth associations and schools clubs may be used as bridges to reach the youth.

Awareness has to be created among people in the study area about the great contribution of weedy herbs to their medicinal flora so as to change the traditional notion by some that weeds are useless plants. In this way, it is possible to ensure that people would come to tolerate and encourage these plants in marginal area. Practicing eco-agriculture would also create "corridors" for such species to survive with viable populations.

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