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Research Article

ETHNOBOTANICAL STUDY ON TRADITIONAL MEDICINAL PLANTS IN DEGA DAMOT WOREDA, AMHARA REGION, NORTH ETHIOPIA

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ABSTRACT

Introduction: Ethnobotany involves an interdisciplinary approach encompassing the fields of botany, chemistry, pharmacology and anthropology. The usage of traditional and complementary medicine is on the increase in many developed and developing countries. **Objective**: The study was done to identify major medicinal plants, and also to document the traditional medicinal plants and their medicinal uses in Dega Damot Woreda, Amhara Region, Ethiopia. **Methodology and Materials**: A community based cross-sectional descriptive study is conducted on a total of 70 informants, among which 20 were traditional healers and the rest were heterogeneous groups of study participants to survey the usage customs of traditional medicinal plants. **Results and discussion:** In this study, 50 participants were included of which 62% of them were illiterates. 20 well recognized traditional healers were also included, among which 18 were males and 2 females. Most of the traditional healers indicated that their sources of knowledge was from their fathers. In the study area *Croton macrostachyus* and *Ranunculus multifidus* were ranked first which were most effective for the treatment of malaria and the treatment of visceral leishimaniasis *(Chinkur)* respectively. Also, 54 plant species were reported for their medicinal values. Euphorbiaceae are the dominant family, followed by Solanaceae. The 54 plant species were used for 38 types of ailments. Roots and leaves were the most frequently used plant parts. Chopping, pounding and crushing are the most frequently used ways of preparing drugs in the study area and the drugs were administered orally. **Conclusion:** The people in the study area are knowledgeable about the plants, their distribution, parts of the plants and its use. Different medicinal plants are used to treat various illnesses and herbal medicine remains the most important component of public health care. It is important to create awareness about the conservation of medicinal plant and the importance of maintaining the knowledge about herbal medicine.

Keywords: Ethnobotany, Traditional medicine, Medicinal Plants, Dega Damot Woreda, Ethiopia.

INTRODUCTION

Ethnobotany is defined as “local people's interaction with the natural environment: how they classify, manage and use plants available around them”. It involves an interdisciplinary approach encompassing the fields of botany, chemistry, pharmacology and anthropology. In general, ethnobotany is the scientific investigations of plants as used in indigenous culture for food, medicine, magic, rituals, building, household utensils and implements, musical instruments, firewood, pesticides, clothing, shelter and other purposes.[1, 2]

Global perspective of traditional medicine

Trends in the use of traditional and complementary medicine are on the increase in many developed and developing countries.

In the USA, it was estimated that 42.5 million visits were made to herbalists in 1990, contrasting with the 388 million actual visits to primary health care physicians.[3] In 1992, 20 million patients in Germany used homeopathy, acupuncture as well as chiropractic and herbal medicine as the most popular forms of complementary medicine. In Australia in 1998, about 60% of the population used complementary medicine, 17,000 herbal products had already been registered and a total of US $650 million was spent on complementary medicine.[4]

In China traditional medicines account for 30–50% of total medicinal consumption. Within China the traditional systems of health care are incorporated into the formal component of national health care. Also, there were more than 160 scientific research institutions of traditional Chinese Materia Medica, forming a scientific research system.[3] In India, where 75% of the population depends on herbal preparations in 1991, 540 plant species were reported to be used in different formulations. In 1995, there were 250,000 registered TM practitioners, the majority having received training in degree graduating college.[3]

Traditional medicine in Ethiopia

The introduction of modern medicine to Ethiopia dates back to the 16th century during the regime of Emperor Libne Dingel (1508-1540). The first government run modern health care was established in 1906 with the opening of Menelik II Hospital in Addis Ababa. However, the growth and development of modern health care in Ethiopia as a whole has been very stunted and to date, its coverage is less than 50% of the population. The vast majority of the rural populations, therefore, still depend on TM and its practitioners.[3]

The use of traditional medicine is still wide spread in Ethiopia, and its acceptability, availability and popularity is no doubt as about 90% of the populations use it for health care needs. In Africa up to 80% of the population uses traditional medicine to help meet their health care needs.[4]

The Ethiopian flora is estimated to contain between 6500 and 7000 species of higher plants of which about 12% are endemic. It is therefore not surprising that some of these plants have chemical compounds of therapeutic value that may be used in the treatment of major diseases such as HIV/AIDS, malaria, cancer, etc. Ethiopia is also a home of many languages, cultures and beliefs which in turn have contributed to the high diversity of traditional knowledge and practices of the people which, among others, include the use of medicinal plants.[5] Plants have been used as a source of medicine in Ethiopia from time immemorial to treat different ailments. In 1993 it was reported that 80% of the Ethiopian population still depends on traditional medicine for their health care practices. More than 95% of traditional medical preparations are of plant origin.[6]

Ethiopians knew the use of bleeding and cupping besides various herbs as purgatives[3]. The earliest known texts are the Geez "Matshafa Faws" of mid-seventeenth century and "Matshafa Madhanit" of the early 18th century. These medical texts contain several references to plants, animal products and minerals as well as magic and superstition. A medicinal plant initially taken from Ethiopia, *Hagenia abyssinica* Gmel. (Kosso in Amharic) was introduced into the international world of medicine as an age-old tested medicament.[7]

The root barks of another tree known locally as “Waginos” (in Geez) were used by people living in northern Ethiopia for many centuries for treating dysentery. The root barks of this plant were cleaned, dried in the sun, and ground into powder and then taken with camel's milk. The plant was later named *Brucea antidysenterica* J.K Miller in honor of James Bruce.[3]

WHO established a worldwide program to promote and develop basic and applied research in traditional medicine. Medicinal plants then have got special attention and regional offices were established by World Health Organization to coordinate basic and applied research activities on medicinal plants.[8]

To preserve indigenous knowledge of plants use in general and of traditional medicine in particular, an ethnobotanical survey of lesser-studied socio-cultural groups is very crucial. However, in Ethiopia research and documentation on medicinal plants has been started very recently. The documenting of medicinally important plants is mainly aimed at developing database for further studies and conservation of the plants. Ethnobotanical studies in Northern Ethiopia[9], Shirka district[10], Butajira and Addis Ababa[11,12], “Zay” people[13], “Shinasha, Agew-awi and Amhara peoples” in northwest[14], People around Debre Libanos monastery[15], ”Dheeraa” town, Arsi Zone[16], people in Dek Island[17], and Meinit ethnic group[19] are some among the studies, which documented some medicinal plants of Ethiopia.

Limited number of the above papers dealt with specific socio-cultural groups in specific areas. When compared to the country's varied flora and the socio-cultural diversity, these studies

are incomplete as medicinal plant healing systems differed from culture to culture. Hence, attention should be given to the field of ethnomedicine of the country with all necessary endeavors to have a full picture of the country's medicinal plants potentials.

The present study was done to identify major medicinal plants, expose the knowledge of the indigenous people, initiate the preservation of knowledge of people about traditional herbal medicine and its uses and also to document the traditional medicinal plants and their medicinal uses in and around Kola Shangi, Dega Damot Woreda, Amhara Region.

MATERIALS AND METHODS

Description of the study area

Degadamot is one of the fourteen woredas of west Gojjam administrative zone of the Amhara Regional state. The woreda is 271 km from the capital of the Amhara Regional state, Bahir Dar and the administrative zone. It is 401 km North of Addis Ababa, the capital city of Ethiopia. Topographically, Dega Damot Woreda is 35% mountainous, 30% ups and downs, 20% valleys and 15% plains.

Study area

Dega Damot Woreda has four major climatic zones. These are Dega 75%, woina Dega 20% and kola 5%. Different species of plants are grown in these four different climatic zones.

Population

According to the document of the woreda (written in 2001) the total population of the woreda is 197,007, of which 98,267are females and 98,740 are males with a ratio of almost 1:1. From these 1689 males and 2130 females are living in the town. The remaining 96,578 males and 96,610 females are living in the rural areas. About 85% of the population is engaged in agriculture. Only Amhara ethnic groups are found in the woreda. About 98% of the population is Orthodox Christians and the rest are Protestants. Amharic is the only language used in the Woreda.

Health service and common health problems

In the woreda there are 31 health posts in the 31 kebeles and one health center in its capital, Feresbet. According to the document found in the health center in Feresbet, the most prevalent diseases in their decreasing order are summarized in the following table

(**Table 1**. Common health problems and their prevalence in Degadamot Woreda).

Selection of the kebeles and informants

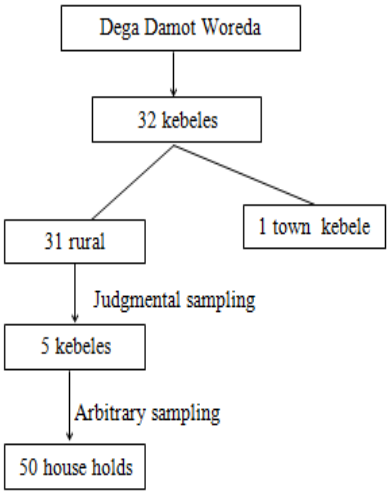
A community based cross-sectional descriptive study is conducted to survey the usage customs of traditional medicinal plants by the inhabitants in and around kola shangi, Dega Damot Woreda.

For the Ethnobotanical survey, five kebeles were selected based on convenience sampling that is based on the convenience of the researcher to get enough information. The five kebeles were kola shangi, Kola Yeshoh, Kola Feresbet, Kola Gidilign and chat warka. According to the unpublished information from each kebele, the respective numbers of households are 418, 508, 324, 283 and 437.

A total of 70 informants were involved in the study, among which 20 were traditional healers and the rest were heterogeneous groups of study participants. The respondents include knowledgeable elders (shimagles), mothers, shepherds, adults, young females and priests who were selected through judgmental and referral sampling. They were also selected based on their availability, willingness and good acceptance in the community. Selection was also done based on the information from the local kebele administrators and elders among the local community. The sample size was determined by using arbitrary approach according to the number of households in each kebele.

However all the well known traditional healers in the selected kebeles were included in the study except one who was practicing the activity before but now he is a monk and he said that the practice has some sin in it and he never wanted to talk about anything. Ten informants whose ages were greater than 50 were considered as key informants. The selection of the key informants was based on the information from the kebele leaders and other knowledgeable elders.

The sampling frame of the woreda



Ethnobotanical data collection

The Ethnobotanical data was collected between March and April 2010, using a semi-structured checklist consisting questions or issues prepared in advance. Two separate questionnaires, one for the traditional healers and the other for heterogeneous study participants.

Most of the questionnaires were open-ended in order not to restrict the ideas of traditional healers and other study participants and the rest were close-ended. The interviews were based on and around this checklist and some issues were raised promptly depending on responses of an informant. All of the interviews were held in Amharic. The place and time for discussion were set based on the interest of the informants.

The study was also supplemented by focused group discussion with the selected key informants. The informants were first asked about themselves and their experience as healers. In a more structured interview, the healers were asked about plants, the use(s), method of preparation of plants, route of administrations as well as storage, side effects, contraindications and antidotes of the herbal preparations. Specimens for most of the medicinal plants were collected and identified by a botanist in EHNRI. Vocher specimens were also stored there. The data collected for each plant consisted of the local /vernacular names, the parts of the plants used, and uses of the plants, place of collection, preparation of the plant parts used and the route of administration.

Analysis of ethnobotanical data

The Ethnobotanical data was analyzed using quantitative and qualitative methods of data analysis. Descriptive statistics such as percentage, frequency distribution and graphs were used to analyze the data collected through semi-structured, open ended and some close ended questions. The ethnobotanical data collected was analyzed to get the number of traditional medicinal plants, scientific names of plants, uses of plants, parts of the plants mostly used and the route of administration. Preference ranking using paired comparison as suggested by Martin[20] was conducted. The preference values assigned by the key informants for the selected medicinal plant species for specific diseases were added and ranked during preference ranking.

RESULTS AND DISCUSSION

Socio-demographic characteristics of study participants

Heterogeneous groups of study participants

In this study, a total of 50 heterogeneous groups of study participants were included. Among them 35 (70%) of the respondents were males and 15 (30%) females. All the study participants were Amharas and Orthodox Christians. 62% of the group study participants were illiterate and 12%, 10% and 8% of them attended literacy campaign, church education and grades one to six respectively. The age range of the study participants were approximately between 18 and 102. (**Table 2**. Socio-demographic characteristics of heterogeneous groups of study participants (N=50) in and around Kola Shangi, Dega Damot Woreda, Amhara Region).

The most common diseases reported by the heterogeneous groups of study participants were malaria, "*mich",* jaundice, "*megagna", "kurtmat",* leprosy, elephantiasis, TB, "*chife", trachoma,* breast cancer, "*gormit",* dysentery, ascaris, stomach worms, leishmaniasis, evil eye, "*mogn bagegn"* and "*konitr".* About 58% these participants reported that their corresponding action taken against the above illnesses was going to the traditional practitioners. About 26%, 10% and 6% of the study participants reported that they used modern medicine, self care and no action respectively for the illnesses mentioned. For most of those study participants who preferred traditional practitioners, their reasons were that traditional medicines are cheap and more effective than modern medicine. Proximity was one factor for some of the respondents which is similar to other studies.[12]

It has been also reported that some of the illnesses as *mogn bagegn*, evil eye and *kontir* could not be treated by modern medicine.

Traditional healers

Twenty well recognized traditional healers were included in this study, among which 18 were males and 2 females. All were Amhara and Orthodox Christians. Most of the traditional healers attended church education and were priests and MeriGetas. In most cases, the traditional herbalists in the northern part of the country are from the churches and monasteries. The knowledge from these herbalists is passed secretively from one generation to the next either through words of mouths or their descendents inherit the medico spiritual manuscripts. Most of the traditional healers were men; this is because according to the elders in the area parents transfer the knowledge of traditional medicine to their sons and not to their daughters and patients prefer to go to men healers than women. But according to different studies, many female healers take care of the family level treatments.[10,14, 21]

Most of the traditional healers (70%) included in this study were in the age range of 41 to 80 years. Concerning the educational status of traditional healers, most of them (50%) attended church education but 25% were not educated. 10% of the traditional healers attended literacy campaign and 15% attended grades 1 to 8.

Most of the traditional healers indicated that their sources of knowledge were their fathers (50%) followed by from friends (25%) and relatives (15%), this is also true in Dabat [21], in Addis Ababa[22] and Butajira[11]. 60% of the traditional healers had from 21 to 40 years of experiences. Two healers had more than 40 years of experience. 96% of them claimed that they were not able to tell the number of patients treated by them per day or per year. The rest said that the number of patients to be treated depends on the weather condition and the month. For example, many patients came to the traditional healers around October and June where malaria is common and many feet problems (wound on the leg) in summer. (**Table 3**.Socio-demographic characteristics of traditional healer (N = 20) in and around Kola Shangi, Dega Damot Woreda, Amhara Region).

According to traditional healers, malaria, "*Mich",* jaundice, "*megagna", "kurtmat"*, leprosy, elephantiasis, TB, "*chife",* tracoma, breast cancer, "*Gormit",* dysentery, ascaris, intestinal parasites, leishmaniasis, evil eye, "*mogn bagegn"* and "*kontir"* were the most frequently reported illnesses in the study area which is in line with the reports of the heterogeneous study participants. But this was different from what was indicated among the 20 top diseases in the woreda, except malaria which is the most prevalent disease in both cases.

Preference ranking of medicinal plants that were reported to be used for the treatment of malaria and "*chinkur"* (leishmaniasis) was done by the key informants. Malaria was reported to be the most frequently occurring illness in the study areas as reported by the study participants and from the 3rd quarter report of the health center in Feresbet, but leishmaniasis was not included in the report. It was claimed that patients with leishmaniasis preferred traditional healers thinking that leishmaniasis could not be treated by modern medicine.

Preference ranking values were obtained from the over all ranking of the medicinal plants. Preference ranking was done for 6 and 7 medicinal plants that were reported as effective for treating malaria and *chinkur* respectively. The ranking was conducted by selecting 10 key informants that are heterogeneous groups of study participants. The key informants were asked to compare the medicinal plants given based on their efficacy for the specific illnesses. The highest numbers were given for the medicinal plants which were most effective according to the key informants for treating malaria and *chinkur*. The lowest number was given for the least effective medicinal plant.

As described in the table 4 and 5 below *Croton macrostachyus* and *Ranunculus multifidus* scored the highest mark and ranked first indicating that the two medicinal plants were the most effective for the treatment of malaria and *chinkur* respectively. (**Table 4.** Preference ranking of medicinal plants used for the treatment of malaria by the key informants **and Table 5.** Preference ranking of medicinal plants used for the treatment of Visceral Leishimaniasis (Chinkur) by the key informants).

Utilization of the drug plants

In this study a total of about 65 medicinal plant species were collected and most were classified botanically. According to Kokwaro medicinal plants may be broadly classified botanically or according to the species from which drugs are obtained, according to the purpose for which a species is used and according to the chemical nature of the species. This classification is employed in this study. The use of local medicinal plants varies from species to species, from disease to disease, from place to place and from person to person[23]. Similarly in this study the use of traditional medicinal plants vary from species

to species, from disease to disease, and from place to place.

According to the present ethnobotanical survey about 54 plant species were reported by the study participants for their medicinal values (tables 6 and 7). The medicinal plants reported belong to 48 genera and 35 families. In terms of the medicinal plant species, Euphorbiaceae are the dominant family (07 genera and 07 species), followed by Solanaceae (06 genera and 06 species).

The 54 medicinal plant species mentioned are used as a cure to 38 types of ailments. Majority of the reported medicinal plants are used for the treatment of malaria, "*chinkur"* and "*hodkurtet".* The rest are used to treat "*Gormit", eye* disease, cough and Jaundice. According to the documentations of the traditional medicinal plants of northern Ethiopia[24], the potentiation effect or synergistic interaction of one plant on the other can play a positive role on the desired therapeutic effect. Multiple sources or polyherbal preparations may have useful or detrimental effect in the traditional medicinal practices. Moreover healers may intentionally use polyherbal preparations to disguise or mask the potent plants and this could lead to unwanted side effects due to the various constituents that the preparation contains.[10]

In this study, of the total 54 medicinal plants 68.5% were prepared from single plant species while 31.5% were prepared from two or more species. Combinations of medicinal plants are used to treat eye disease, *chife*/eczema, syphilis, jaundice, "*hodkurte"t,* malaria, "*kurtimat", "chinkur"*, "evil eye", "*lash",* tooth ache and common cold. The highest number of medicinal plants in a poly prescription is six that is used to treat "evil eye" followed by syphilis, "h*odkurtet",* malaria and "*lash"* (table 6, 7, 8 and 9). (**Table 6:** Plants used with a single prescription in the treatment of human disorders in and around Kola Shangi, Dega Damot Woreda, Amhara Region April 2010, **Table 7.** Plants Used as Poly prescription, **Table 8.** Plant species used in the treatment of malaria and **Table 9.** Plant species used traditionally for the treatment of visceral leishimania (chinkur)

Medical preparations of different origin other than plants

In the study area, both traditional healers and heterogeneous groups of study participants reported that they used not only medicinal plants but also other things found in their area (table 9). Most of the traditional healers explained that even if medicinal plants are more advantageous, other medical preparations like *Yetazma zil* are very effective for different illness. (**Table 10.** Medicinal preparations of different origin other than plants)

Medicinal plants with veterinary importance

In the study area, different forms of remedy preparations and applications to treat live stock diseases are used. The most popular and widely used medicinal plants reported in this study were eight species of medicinal plants (Table 11). The plants parts used were root (37.5%), leave (25%) fruit, seed, stem bark and juice (12.5%) each. The most widely used methods of preparation of the remedies was crushing, grounding and squeezing. Based on the nature of the ailments, the disease conditions and the ability of the live stocks to take the remedies were applied through different routs. Oral followed by topical route of application were mostly used. (**Table 11.** Medicinal plants with veterinary importance).

Parts of the medicinal plants used and time of collection

Roots and leaves were the most frequently used plant parts accounting 23% and 21% of the indicated medicinal plants respectively, that is the root was one of the most extensively used plant part in the preparation of traditional herbal medicine. The same idea is also reflected in studies conducted in Ethiopia[6,25,10,21,13,22], leaf is more favored in the preparation of herbal medicines. But the use of root has significant implications in the destruction of plant species and attention should be given to preserve these plants whose roots are extensively used. The next most widely used plant part are shoot apex (15%), latex (13%), fruit (11%), seeds (8%), bulbs (3%), Rhizomes (2%), exudates (gums), stem bark and juice (1%) each. In some cases the whole plant including the roots was utilized (Figure 1). (**Fig 1.** Plant parts used in herbal preparations)

All the medicinal plants identified in this study were collected from the wild. This indicates that the traditional healers and the community depend on the wild source or the natural environment rather than home gardens to obtain the medicinal plants and the activity of cultivating medicinal plants is very poor. It also indicates that the natural forest is being over exploited by traditional healers for its medicinal plants. This is also true in a research paper by wondimu and woldegrima.[16,21]

Concerning the time of collection, most of the respondents (79.4%) and traditional healers

(93.7%) preferred to collect the medicinal plants at dusk and mostly on Wednesdays and Fridays. Their explanation was that dusk is preferable because it is not allowed to talk to other people while collecting and taking to their home and in order not to expose what type of plant they used. One could not also urinate while he/she is collecting the medicinal plants. According to the healers, Wednesdays and Fridays are preferred because they are fasting days and they believe that on these days sexual contact is not allowed. Summer (83.7%) among the seasons and Pagume (13th month as per Ethiopian Calendar which consists of 5 or 6days) (68.4%) and September (25.7%) among the months were preferred to collect the medicinal plants. The explanation given was that most of the plants and their different parts could easily be found during summer. Majority of the traditional healers and some study participants believe that the beginning of the year is the best for everything. Similar practice is carried out in research by abebe, woldegerima and Giday.[6,14,21] Some traditional healers (5.9%) reported that time of collection could vary based on the season in which some diseases are prevalent.

Preparation of the Remedies and route of Administration

The medicinal plants have various methods of preparation and application for different types of ailments and they have various preparation forms like concoction, decoction, powder and crushed and homogenized in water. Similarly in this study different methods of preparation of remedies were reported. Since root is the most widely used part of plants, the method of soaking in cold water may occasionally be used in preparing root or stem drugs.[23]

Chopping, pounding and crushing are the most frequently used ways of preparing drugs in this study. The utilization and administration of the medicinal plants vary depending on the type of diseases.[16]

There are many methods of applying or administering the prepared drugs to the patient, and these depend largely on the particular disease to be treated. The application also follows closely the method by which the drug has been prepared.[23]

Among the different routes of administration most of the drugs were administered orally and this is indicated in different studies in Ethiopia[3,5,6,13,16,21]. The next most common route of administration was topical. Similar idea was reflected in Zegie and in Debrelibanos.[18]

Concerning the dosage forms both the study participants reported that it all depends on the type of disease, its severity and age of the patient and his/her background. For example, if the patient is old or a child, according to their explanation dosage had to be minimized and be given in wide range of time. But lack of precision in the determination of doses had been noted.

Side effects, Antidotes and Contra indications

In this study, of the total 54 medicinal plants side effects, antidotes and contraindications were indicated only to some plant species. The major side effects in their decreasing order of frequency are headache, vomiting, diarrhea, gastritis [burning sensation], “hodnifat”, waist pain, sight problem, hearing problem and unusual mouth smell for those remedies taken orally. Sweating, exhaustion and urination were also indicated as side effect by some healers and study participants. Similar side effects of medicinal plants were also reported in a research paper.[3,10,21] (**Table 12:** Side effects, antidotes and contraindication of some medicinal plants).

CONCLUSION

The people who live in and around Kola Shangi, Dega Damot Woreda, Amhara Region are knowledgeable about the plants, their distribution, uses and parts of the plants used. In the study area medicinal plants are used to treat various illnesses and herbal medicine remains the most important component of public health care.

Among the plant parts, root is the most commonly used and most of the medicinal plants are collected from the wild. This aggravates the loss of medicinal plants from time to time. Information conveyance about medicinal plants is through words of mouth, which might result in loss of the information. Therefore, it is important to create awareness about the conservation of medicinal plant and the importance of maintaining the knowledge about herbal medicine.

Table 1: Common health problems and their prevalence in Degadamot Woreda

	Health problems	Percent
1.	Malaria	13.49
2.	Helmenthasis	11.98
3.	Pneumonia	9.23
4.	Dyspepsia	7.16
5.	Typhoid fever	6.75
6.	Diarrhea (non-bloody)	6.02
7.	Infections of muscles, bones and joints	3.67
8.	Infections of skin and subcutaneous tissues	3.55
9.	Violence and other intentional injuries	3.54
10.	Acute upper respiratory infection	3.36
11.	Diarrhea (with blood)	2.89
12.	Urinary tract infection	2.88
13.	Other or unspecified respiratory diseases	2.59
14.	Eye infection	2.33
15.	Epilepsy	2.21
16.	Tonsilo pharangitis	1.9
17.	Acute bronchitis	1.89
18.	Noninfectious musculoskeletal diseases	1.46
19.	* Unspecified trauma	6.37
20.	* Un classified diseases	5.42

*Diseases written without keeping their order because they are unspecified

Table 2: Socio-demographic characteristics of heterogeneous groups of study participants (N=50) in and around Kola Shangi, Dega Damot Woreda, Amhara Region, Ethiopia

Characteristics	Frequency	Percent
1.Gender		
Male	36	72
Female	14	28
2.Age		
18-29	5	10
30-39	8	16
40-49	4	8
50-59	9	18
60-69	6	12
70-79	7	14
80-89	8	16
90-102	3	6
3.Ethnicity		
Amhara	50	100
4.Religion		
Orthodox Christian	50	100
5.Status of the study participants		
Elders (males)	6	12
Mothers	8	16
Adults	17	34
Young females	6	12
Priests	6	12
Shepherds	7	14
6.Educational status		
Illiterate	31	62
Church education	6	12
Literacy campaign	4	8
Grades 1 to 6	5	10
Grades 7 to 8	3	6
Grades 9 to 12	1	2

Table 3: Socio-demographic characteristics of traditional healer (N = 20) in and around Kola Shangi, Dega Damot Woreda. Amhara Region, Ethiopia

Characteristics	Frequency	Percent
1. Gender		
Male	19	95
Female	1	5
2. Age		
22-30	2	10
31-40	2	10
41-50	2	10
51-60	3	15
61-70	6	30
71-80	3	15
81-90	2	10
3. Ethnicity		
Amhara	20	100
4. Religion		
Orthodox Christian	20	100
5. Educational status		
Illiterate	5	25
Church education	10	50
Literacy campaign	2	10
Grades 1 to 6	2	10
Grades 7 to 8	1	5
6. Sources of healing knowledge		
Father	10	50
Mother	1	5
Relatives	3	15
Friends	5	25
Gift of God	1	5
7. Healing experiences		
≤ 10 years	4	20
11-20 years	2	10
21-30 years	8	40
31-40 years	4	20
> 40 years	2	10

Table 4: Preference ranking of medicinal plants used for the treatment of malaria by the key informants

No.	Medicinal plants	Key informants											
		A	B	C	D	E	F	G	H	I	J	Total	Rank
1	*Phytolata dodecandra*	5	4	3	2	4	5	3	3	2	4	35	3
2	"Yedha mechagna areg"	1	2	1	3	1	2	1	2	1	1	15	6
3	*Justica schimperiana*	3	1	2	4	3	1	2	4	3	2	25	5
4	*Euphorbia abyssinica*	2	3	4	1	2	3	6	1	5	3	30	4
5	*Vernonia amygdalina*	6	6	5	6	5	4	4	5	4	5	50	2
6	*Croton macrostachys*	4	5	6	5	6	6	5	6	6	6	55	1

Table 5: Preference ranking of medicinal plants used for the treatment of Visceral Leishimaniasis (Chinkur) by the key informants

No.	Medicinal plants	Key informants											
		A	B	C	D	E	F	G	H	I	J	Total	Rank
1	*Hordeum vulgare*	2	3	2	2	4	3	1	7	1	2	27	6
2	*Fixus vasta*	1	2	3	1	1	2	2	2	6	1	21	7
3	*Clematus hirsuta* and *Guil and Euphorbia abyssinica*	4	5	1	3	3	1	6	1	3	4	31	5
4	Yegedie wotet	3	1	7	4	2	6	4	3	2	5	37	4
5	*Rhaminus prinoides*	5	4	4	6	5	7	3	4	5	7	50	3
6	*Ranunculus mulitidus*	6	7	5	7	6	5	7	6	7	6	62	1
7	*Rumex abyssincus jacq*	7	6	6	5	7	4	5	5	4	3	52	2

Table 6: Plants used with a single prescription in the treatment of human disorders in and around Kola Shangi, Dega Damot Woreda, Amhara Region, Ethiopia

No.	Species, Family	Local name	Parts used	Uses and preparation antidotes
1	*Allium cepa* . Liliaceae	Key shinkurt	Bulb	For hypertension, the bulb is chopped, macerated in water, filtered and drunk
2	*Aloe sp,* Liliaceae (Aloaceae)	Ret	Leaves	For gastritis, the spongy leaves are chopped and macerated in water for a night, a glass of the bitter solution is drunk every two hours.
3	*Artemisia abyssinica schtz,* Afra Jacq Asteraceae	Chikugn	Leaves	For evil eye. The leaves are pounded as they are fresh and mixed with powdered garlic and smelled to the patient. For common could. The fresh leaves are put in the nose and smelt regularly until quire.
4	*Avera sp.,*	Engirdad	Seed	To remove any worm in/on the body. It is milled, powdered and applied on the washed wound
5	*Bersama abysinica Fresen*, Melianthaceae	Abalo	Fruit	To treat chife (eczema), the fruit of 1 and root of 2 is pounded to powder and mixed with honey or butter and applied on the wound.
6	*Capsicum Sp. L,* Solanaceae	Berberie	Fruit	To treat tonsillitis, the fruits are crushed and the patient is fumigated by adding the fruit on an open fire till sneezing, the tonsil moves up while sneezing
7	*Carissa spirarum*, Apocynaceae	Agam	Apex	For any poisoning by insects or animal bite, seven apexes from seven different places are collected and crushed. It is applied on the affected body part as bandage.
8	*Citrus durantifolia (christm.) swingle,* Rutaceae	Lemi	Latex /juice	For common cold. Areki and the juice of lemon is mixed and held in the mouth or fumigated
9	*Clematis hirsuta perr and Guill*, Ranunculaceae	Yeazo Areg	Stem Leaves	To treat swelling, the smooth bark is removed, and the stem is chopped and applied on the swelling To treat swelling by Nekersa. The leaves are crushed and applied on the swelling as bandage
10	*Clutia abyssinica Jaub and Spach,.* Euphorbiaceae	Fiyele Feji	Leaves	To kill Nekez. The leaves are dried, ground to powder and a cup of it is added to a quintal of food grain (ehil).
11	*Commiphora sp,* Bruceraceae	Nech Etan	Exudate (Gum)	For hodkurtet. The latex is chopped and one or two pieces is chewed
12	*Cucumis ficifolius A.Rich,* Curcurbitaceae	Yemdir embuay	Root	To treat chife (eczema), the fruit of 1 and root of 2 is pounded to powder and mixed with honey or butter and applied on the wound.
13	Cycopersicon Ecnlentum	Timatim	Fruit	For cough, heart disease (Lib Himem), the fresh tomato is eaten occasionally in the morning.
14	*Datura stramonium L,* Solanaceae	Astenagir	Fruit	To prepare Abisho (Yetmihrt medhanit.) the fruit is ground and eaten with wot prepared from only garlic, berberie and shiro with teff injera by reading melka Eyesus for 7 days. (especially for children.)
15	*Dodonea angestifolia,* Sapindaceae	Kitkita	Shoot apex	For chife, the apex is charred on an open fire and the powder is mixed with butter and applied on the affected area.
			Leaves	To treat any broken part of body, the leaves are crushed and applied as bandage being held by bamboo (Kerkeha), Shembeko and tied by a rope.

16	*Euphorbia sp. Gmel,* Euphorbiaceae	Kulkual	Latex	For Diabetes, the Kulkual is cut and squeezed until enough is collected, a cup and half is drunk three times a day before food. For hemorrhoids, the latex is collected and applied on the swelling as it is fresh. To treat ascaries 7 drops of the latex is added on fresh Injera, it is swallowed in empty stomach every morning till cure
17	*Ficus spp.*	Kotlebeles	Latex	To remove torn (gareta) from any part of the body even eye, the latex is added on the part wounded repeatedly till it is removed.
18	*Gladious candidus (Rendle),* Goldblatt Iridaceae	Milas Golgul	Root	For Nekersa (cancer).The root is powdered and applied on the wound, or the powder is mixed with water and drunk.
19	*Hagenia abyssinica* (Bruce) J.F. Gmel, Rosaceae	Kosso	Fruit	To treat tapeworm, the fruits are ground, mixed with milk and drunk in empty stomach in the morning
20	*Impatients tinctoria*	Ensosila	Root	For abortion. The roots are chopped, crushed, mixed with water and drunk once or twice. For arthritis (Rih) the roots are chopped, boiled, crushed and drunk.
21	*Kalancheo petitiana A.Rich,* Crassulaceae	Andahula	Root	For ascaris, the root is cut with a knife of horn and chopped on un movable stone, and mixed with water, it is squeezed between palms, applied in the left nose, then moved the stomach.
22	*Lageniaria siceraria,* Cucurbitaceae	Kil	Leaves Fruits	For nekersa and Jorow lemimegl. (pus from ear) The leaves are crushed, squeezed, and applied on the wound or in the ear in small drops. For Kurba, water is added in tehkil. The bitter liquid is drunk for 8 days.
23	*Lepidium sativum L,* Apiaceae	Feto	Seed	For evil eye, megagna, mich The seed is crushed, mixed with water and sprayed on body parts. To treat dysentery, the seed is pounded, mixed with Yoghurt, shaked well and drunk.
24	*Linum usitatissimum L.* Linaceae	Telba	Seed	To treat Gormit(Kola Kusil), it is mixed with honey and bandaged on the wound.
25	*Musa x paradisiaca L.* Musaceae	Muz	Fruit	To treat cough, banana is eaten every morning in empty stomach for five days before food
26	*Phytolacca dodecandara L'Herit,* Phytolaccaceae	Mekan endod	Apex	For kurba. The apex is squeezed between palms and a cup of it is drunk in the morning in empty stomach for seven days. One glass of aguate is drunk immediately.
27	*Plantago lanceolata L,* Plantaginaceae	Gorteb	Leaves Seed	To treat Gormit (yekola kusil), the fresh leaves are pounded, to powder, the wound is washed and the powder is applied on the wound For snake or scorpion bite. The seed is ground and eaten with teff injera or mixed with water, filtered and eaten
28	*Ranunculus mulifidus Forssk,* Ranunculaceae	Etsesyol	Leaves	The leaves are pounded to powder and mixed with honey (to attach) and applied on the wounds.
29	*Rehamnus prinoides L. Herit,* Rhamnaceae	Gesho	Leaves	The leaves are crushed into powder and applied as bandage on the wounds.
30	*Rumex abyssinicus Jacq*, Polygonaceae	Mekmeko	Root	To treat hepatitis (yewofitu). The roots are crushed, powdered, and mixed with the dried and powered meat of a bat and eaten once or twice.
31	*Rumex nervosus Vahl,* Polygonaceae	Ambacho	Leaves	To treat wound during male circumcision. The leaves are crushed,

				squeezed between palms and applied on the wound.
32	*Solanum sp. L,* Solanaceae	Embuay	Fruit Fruit latex	For TB and cough, the fruit is washed, dried and crushed. It is boiled, and drunk with butter every morning till cured To treat *Gormit, chife*. The wound is washed with water, the embuay is squeezed between palms and the latex is applied on the wound
33	*Trichodesma zeylanicum*	Yewusha milas	Roots	For abdominal colic (Kurtet) and hod Nifat. The roots are chopped mixed with water, filtered and a glass of it is drunk for three days in the morning.
34	*Trigonella foenum-graecum* L, Fabaceae	Abish	Seed	To treat jimatu yetasere (yekerere). The seed is ground, mixed with honey and shaked well. It is eaten regularly
35	*Vernonia amygdalina Del.,* Asteraceae	Girawa	Leaves	To expel placenta). The leaves are pounded mixed with honey, chewed and only the liquid is swallowed. For *figna wudgat*, the leaves are crushed and ground. Fresh honey is prepared and one glass is dunk from each at the same time.
36	*Zehneria scabra (L.F),* Cucurbitacea	Areg resa	Leaves	For mich; the leaves are boiled in water and the patient is fumigated or the leaves are squeezed between palms and the juice is applied on the skin
37	*Zingiber officinale Roscoe*, Zingiberaceae	Ginger	Rhizome	For hod kurtet. The bark is removed, chopped, chewed and the liquid is swallowed.

Table 7: Plants Used as Poly prescription

No.	Species, Family	Local name	Parts used	Preparation
1	1. *Jasminum floribundum,* R.Brex Fresen Oleaceae 2. *Olea europaea L. sub sp.*, Africana Oleaceae	Tembelel Woira (Yera)	Apex Apex	For eye disease, the apexes of either 1 or 2 is collected from seven different places, it is crushed and squeezed by a piece of cloth on the eye
2	1. *Bersama abysinica Fresen*, Melianthaceae 2. *Cucumis ficifolius A.Rich,* Curcurbitaceae	Abalo Yemdir embuay	Fruit Root	To treat chife (eczema), the fruit of 1 and root of 2 is pounded to powder and mixed with honey or butter and applied on the wound.
3	1. *Croton macrostachyus Del.,* Euphorbiaceae 2. *Jestica schimperiana* (Hochst.) Wees. Acanthaceae	Missana Smiza	Apex Apex	For treating yewofitu, seven apexes from 1 and 2 is cut, boiled, pounded and mixed with butter and awazie. It is eaten with a quarter of Injera in three pieces every morning till cure (color of eye and nail changes.), then a lot of Aguat is drunk.
4	1. *Solanum sp.,* Solanaceae 2. *Solanum incanum L.,* Solanaceae 3. *Sida ovata Forssk,* Malvaceae	Zerech embuay Embuay Chifrig	Fruit Root Root	To treat syphilis, the fruit of 1 and the roots of 2 and 3 are crushed together and mixed with honey and swallowed.
5	1. *Clerodendrum myricoides*, (Hochst.) R.Br. exvatke Lamiaceae 2. *Solanum incanum L.,* Solanaceae 3. *Croton macrostachyas Del.*, Euphorbiaceae	Misirch Embuay Missana	Leaves Root Apex	To treat hod kurtet, the leaves of 1, roots of 2 and the apex of 3 are pounded together, mixed with fresh butter (lesta kibe) and swallowed. Then a lot of wogemit is also drunk.
6	1. *Rumex steudelli*, Polygonaceae 2. *Solanum C.F. Adoens,* Hochst Solanaceae	Tult Zerech embuay	Root Root	To treat Kurtimat. The roots of 1 and 2 are mixed and ground, then a cup of it is drunk only once.
7	1.*Carissa spirarum L.,* Apocynaceae 2. *Clausena anisata (willd)* Benth. Rutaceae 3. *Cucumis ficifolius A.Rich,* Cucurbitaceae 4. *Jestica schimperiana*	Agam Limech Yemdir embuay Smiza	Root Root Fruit Root	For evil eye, the roots of 1,2,4 are cut by yealteganene (Dingil) boy with woira ankasie (spear) and mixed with the ground powders of 3,5 and 6. It is dropped on the fore head and nose. It is prepared in pagume.

	(Hochst.) wees. Acanthaceae 5. *Ruta chalapensis L.* Rutaceae 6. *Allium cepa L.* Alliaceae	Tena adam Nech shinkurt	Fruit Bulb	
8	1. *Allium cepa L.* Alliaceae 2. *Euphorbia sp.* Euphorbiaceae 3. *Triticum alstivum L.*	Nech shinkurt Kulkual Sindie	Bulb Latex Seed	To treat lash, the garlic is crushed, the latex of 2 is added on the dough of 3 and the three are mixed and applied on the head.
9	1. *Eucalyptus globules labill,* Myrtaceae 2. *Otostegia, iintegrifoli,a* Lamiaceae	Nech Bahirzaf Tunjit	Apex /leaves Leaves	For common cold. The apex and 1 and the leaves of 2 are boiled together and the patient is fumigated.
10	1. *Croton macrostachyus Del.* Euphorbiaceae 2. *Guizotia abyssinica Caso,*	Misana Nug	Apex Seed	The apex is cut, boiled and squeezed between palms as Besso and dried. It is crushed, cooked with wot and eaten. A lot of nug water is drunk.
11	1.*Ficus sp.,* Moraceae 2. *Euphorbia sp.,* Euphorbiaceae	Shola Kulkual	Latex Latex	For malaria. The latexes of 1,2 and 3 are mixed, boiled with milk and a cup of it is drunk
12	*1. Clematis hirsuta perr and Guill,* Ranunculaceae 2. *Euphorbia abyssinica,* Gmel Euphorbiaceae	Yeazo Areg Kulkual	Latex Latex	For chinkur. The wound is touched with a hot thread and the latex of 1 and 2 is applied on the wound

Table 8: Plant species used in the treatment of malaria

No.	Species, Family	Local name	Parts used	Preparation
1	*1.Croton macrostachyus Del.,* Euphorbiaceae 2. *Guizotia abyssinica Caso*	Misana Nug	Shout Apex Seed	The apex is cut, boiled and squeezed between palms as Besso and dried. It is crushed, cooked with wot and eaten. A lot of nug water is also drunk.
2.	*Phytolacca dodecandra,* L.Herit Phytolaccaceae	Mekan endod	Root	The roots are chopped, mixed with water, filtered and a cup of it is drunk. Then a lot of aguat is drunk. Its antidote-red teff porridge is eaten
3.	*Euphorbia abyssinica Gmel,* Euphorbiaceae	Kulkual	Root	The root is chopped, dried, crushed and eaten with egg then a lot of aguat is drunk.
4	*Euphorbia abyssinica Gmel,* Euphorbiaceae	Kulkual	Latex	The latexes of 1,2 and 3 are mixed, boiled with milk and a cup of it is drunk
5	*Jestica schimperiana,* (Hochst.) Wees Acanthaceae	Smiza	Apex	The apex is cut with kend kara [bilawa with horn handle.] It is crushed, mixed with water, filtered and a cup of it is drunk.
6	*Croton macrostachyus Del.*, Euphorbiaceae	Missana	Apex	The apex is cut from seven different places. It is cooked with chicken (yealteganene) cock wot and a lot of nug wuha is drunk, staying the whole day in a hidden shadow place.
7	*Vernonia amygdalina,* Asteraceae	Girawa	Roots/leaves	Either the roots or leaves are crushed, mixed with water, filtered and drunk
8	*Ficus sp.,* Moraceae	Shola	Latex	The latexes of 1,2 and 3 are mixed, boiled with milk and a cup of it is drunk

Table 9: Plant species used traditionally for the treatment of visceral leishimania (chinkur)

No.	Species, Family	Local name	Parts used	Preparation
1	*Hordeum vulgare L.*, Peaceae	Gebis	Seed	Barely dough (Ligus) is prepared, bread is baked from this Ligus and applied on the wound as bandage with the hot inner soft part. Its antidote-the datura stramonium is crushed, mixed with water, filtered, put in a bottle and the wound is washed with it every morning
2	*Ficus vasta forssk*, Moraceae	Shola	Latex	The latex is applied on the wound till it is cured.
3	*Clematis hirsuta perr and Guill* Ranunculaceae	Yeazo Areg	Latex	The wound is touched with a hot thread and the latex of 1 and 2 is applied on the wound
4	*Euphorbia abyssinica Gmel,* Euphorbiaceae	Kulkual	Latex	The wound is touched with a hot thread and the latex of 1 and 2 is applied on the wound
5	*Rehamnus prinoides L. Herit,* Rhamnaceae	Gesho	Leaves	The leaves are crushed into powder and applied as bandage on the wound.
6	*Rumex abyssinicus Jacq,* Polygonaceae	Mekmeko	Root	The roots are crushed and applied as bandage on the wound.
7	*Ranunculus mulifidus Forssk,* Ranunculaceae	Etsesyol	Leaves	The leaves are pounded to powder and mixed with honey (to attach)and applied on the wound

Table 10: Medicinal preparations of different origin other than plants

No.	Local name	Description	Uses, preparation and antidote
1	*Yegota frash*	Gota is a cointaner made of mud used to contain different grains. When the gota gets old, it is broken into pieces, into frash (yegota frash)	For vomiting. It is dipped in water and smelled when there is a feeling to vomit
2	*Yechew Ginbar*	It is the original salt before it is crushed. It locks like a stone, mostly rectanglar	For leishimaniasis it is heated on an open fire for a short time and applied on the wound. Its antidote is the leaves of astenagr are pounded and applied on the wound
3	*Yetazma zil (ech)*	Tazima is like a bee, it gives honey, yetazma zil is like a pupa of bees, that is before it is completely changed to honey	For leishemaniasis it is added on the wound and when it is dried the chinkur is removed together with it. For cough it is drunk and eaten regularly.
4	*Yeerkum kus*	It is waste product of an animal called erkum	For lash. The west is applied on the head as bandage
5	*Yegumare (Gumye) kus*	It is the waste product of the animals mentioned.	To treat wound on the neck of oxen. The waste product with mixed with fresh butter and applied on the neck
6	*Yekeb Ahya wotet*	It is the milk of a donkey which gives 1st birth.	For kuakuat. The fresh mild is drunk for 3 or 5 days as it is available.
7	*Yejart siga*	It is the meat of an animal called Jart.	For jaundice. The meat is cooked with wot and eaten regularly.
8	*Yekebit shint*	It is the urine of livestockes	Insecticide to kill *temch* and other insects. The urine of livestockes is collected in the morning until it is enough and store for five days. Then a liter of it is mixed with water and sprayed.
9	*Yejib kus and yedimet tsegur*	It is the waste product of a hyna and hair of a cat.	For evil eye. The two are mixed well and hung on the neck with a cloth or leather.
10	*Yebeg angol*	It is the smooth fluid found in the head of a sheep.	For headache (ras wugat) the head of a sheep is boiled and its internal part is eaten
11	*Yefiyel mora (sib)*	It is the fat of a goat.	To prevents snake from coming around home. The fat is put on an open fire and the smoke is distributed.
12	*Yelelit wof siga*	It is the meat of a bat	For jaundice. The meat is dried and pounded. It is mixed with *mekmeko* and eaten.
13	*Yezendo mora (siga)*	It is the meat of an python	To treat elephantiasis. The *mora* is applied as banded on the swelling.

Table 11: Medicinal plants with veterinary importance

No.	Species, Family	Local name	Parts used	Preparation
1	*Musa paradisiaca L.*, Musaceae	Muze	Fruit	To treat cough. The cow/ox is given banana every morning in empty stomach for five days.
2	*Lepidium sativum L.*, Apiaceae	Feto	Seed	For *megagna* and *mich,* the seed is crushed, mixed with water and sprayed on live stocks, muels and donkeys
3	*Aloe sp.*, Liliaceae (Aloaceae)	Ret	Leaves /juice	To treat *kemkim* (wound on the tail of live stocks). The leave are squeezed and the juice is applied on the wound.
4	*Rumex steudelli,* Polygonaceae	Tult	Root	For *kumegna (*evil eye for live stocks). The roots are squeezed or crushed and the juice is even nasally.
5	*Croton macrostachyus Del., Euphorbiaceae*	Misana	Stem bark	To treat rabies. The stem bark is crushed, pounded and powdered. The powder is mixed with water and prepared as *Besso* and given orally with teff injera or bread.
6	*Carissa spinarum L.* Apocynaceae	Agam	Root	To treat wound the root is grounded, powdered and applied on the wound.
7	*Sida ovata Forssk,* Malvaceae	Chifirg	Root	For *mesina* (not able to give birth) and *shitelay* (abortion) cows. The root is grounded and tied with cloth or leather around the fore head between the two horms
8	*Vernonia amygdalina Del.,* Asteraceae	Girawa	Leaves	To repel placenta during birth of cows. The leaves as they are can be eaten in large amount

Table 12: Side effects, antidotes and contraindication of some medicinal plants

Species	Side effects	Antidotes	Contraindication
Croton macrostachyus	Headache, vomiting, diarrhea, urination	Teff injera and porridge	Pregnant women
Vernonia Amygdalina Del.	Headache, diarrhea,		Pregnant women
Euphorbia abyssinica	Headache, diarrhea, vomiting, itching	Red teff porridge, a lot of aguat	Pregnant women
Phytolacca do decandra L' herit	vomiting, diarrhea,	Milk Red teff porridge	Children, Pregnant women
Justice schimperiana	vomiting, diarrhea,	Milk Red teff porridge	Children, Pregnant women
Rumex nervosus vahl	diarrhea, vomiting,	Red teff porridge	Children,
Cucumis ficifolious A.Rich	vomiting, diarrhea,	Teff injera	Children, Pregnant women
Zehneria scabra (L.F) sond	Headache, vomiting, diarrhea,	Taking shower	-----
Otostegia integrifolia Benth	Headache, vomiting,	------	-----
Sida ovata Forssk	-----	------	Pregnant women
Hagenia abyssinica (Bruce) J.F. Gmel	Headache, vomiting, diarrhea,	-----	-----
Clematis hirsute perr and Guill	Headache, Sweating diarrhea,	-----	-----

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