Medicinal plants of Otwal and Ngai Sub Counties in Oyam District, Northern Uganda

Maud M Kamatenesi1, Annabel Acipa2*, Hannington Oryem-Origa1†

Abstract

Background: An ethnobotanical study was carried out in four parishes in the Ngai and Otwal Sub Counties in Oyam district, Northern Uganda, where insurgency has been prevalent for the past 20 years. Documenting medicinal plant species used in treating various health conditions among the local people.

Methods: Information was obtained from mainly the local population, the traditional healers and other experienced persons through interviews, formal and informal discussions and field excursions.

Results: Seventy one plant species were reported for use in the treatment of various diseases in the study area. These plant species belong to 41 families, with Asteraceae being the most represented. Roots were ranked the commonest plant part used. Oral administration was the most frequently used route of administration. A total of 41 different health conditions were reported to be treated by use of medicinal plant species. Thirty nine percent of the recorded plant species were reported for treating stomach related ailments.

Conclusion: The use of medicinal plants in primary healthcare is still a common practice in Ngai and Otwal Sub Counties. The trust they have is built on the curative outcome properties claimed, poverty and armed conflict that lead to inadequate healthcare facilities. The generation gap caused by the over 20 years of insurgency in the area has brought about knowledge gap on the usage of medicinal plant species between the young and the older generation.

Background

World wide over 80% of the people depend on medicinal plant species to meet their day today healthcare needs [1]. Rural household of Uganda rely heavily on plant resources for food, fodder and herbal medicine [2]. Tabuti [2] further asserted that savanna environment contains many plant resources of economic values such as foods and medicines. These resources are widely relied on by rural communities in developing countries because of inefficiencies in service delivery or because social services and goods are unaffordable. For this reason many people are currently resorting to traditional medicine for primary health care due to high costs in accessibility, cultural compatibility, self-reliance among others [3]. They also employ herbal medicines because of cultural preferences and perceived effectiveness [4,5].

Medicinal plant species form a main part of treatment for the rural poor. Traditional medicine usage in rural Ugandan population for day-to-day health care needs is close to 90% [6]. Kamatenesi and Oryem [6] further reported that women and children form the bulk of the people reliant on herbal medicine. According to Katuura et al [7], malaria was reported to be the most common condition treated by traditional healers in Mbarara District. The use of traditional herbal remedies is encountered in both rural and urban areas in Mali and that traditional medicine is one of the surest means to achieve total health care coverage for African’s population [8].

Discourses on the future of traditional medicine in Africa and other indigenous societies often assume government recognition and integration into the formal health care systems [9].

In certain areas in Nigeria, the only health care providers close to the people are the traditional medical practitioners [10]. However, it should be noted that medicinal plant species have also been discovered to have other
uses as some could be used as vegetables, fruits, trees and
ornamentals [11].

Health services in Oyam District are inadequate, and
only 15 out of the 43 parishes in Oyam District have
health facilities. Maternal mortality rate is still high
because clean and safe deliveries are at only 14%
because it is mainly the traditional birth attendants
(TBA) who play a significant role [12].

Methods
Study area
This study was carried out in Ngai and Otwal sub coun-
ties in Oyam District which is situated in northern
Uganda on coordinates 02°14’N 32°23’E (Figure 1) [13].
The sampling sites were located in the Parishes of Ara-
mita, Akuca and Omac from Ngai Sub County and
Abela from Otwal Sub-County. The study was con-
ducted between August 2007 and February 2008 in
Oyam District, Northern Uganda.

Data collection
Ethnobotanical information was obtained through
informed consent semi-structured interviews with key
informants. The key informants consisted of health
workers, renowned herbalists, and local leaders. How-
ever, the bulk of the respondents were local residents
who were identified through household numbers.
Knowledge on the use of medicinal plant species was
documented, the local name of plant species, diseases or
ailments they treat, part of plant used, methods of pre-
paration and administration were recorded.

In addition, a total of 84 households were interviewed
using questionnaires, after being randomly chosen from
the total household list from the LC I (Local Councilor
One) chairperson. Forty four households from Ngai and
another 40 from Otwal Sub Counties were interviewed
through the use of questionnaire. Some questions asked
included; village of respondent, level of education,
knowledge on medicinal plant species among others.

For more studies and information, three focus group
discussions were conducted in Acardano village in Ngai
Sub-County and Abela primary school and Ojwi centre
in Otwal Sub-County. In this case the respondents were
asked research guided questions. The groups comprised
of children 15, women 20 and men 12. The groups par-
ticipated voluntarily at the invitation of LC 1 chairman.
The focus group discussion helped discover the extent
of distribution of knowledge on medicinal plant species.

Voucher Specimens and Sample Collection
Voucher specimens of the documented plant species
were collected according to standard practice, including
roots, flowers, and fruits where possible [14]. Collection
only involved samples that were identified by the
respondent. The voucher specimens were delivered to
Makerere University Botany Herbarium where further
identification and classification was done. Scientific
names of plant species were identified based on Interna-
tional Plant Name Index (IPNI: http://www.ipni.org).

Results
A total of 110 respondents were interviewed from the
study area; 46 were females and males were 64 as
shown in table 1.

From the research findings, 71 medicinal plant species
both wild and cultivated belonging to 42 families were
documented and identified in the study area (Table 2).
The family Asteraceae (5 species) was the most repre-
sented followed by Leguminosae and Lamiaceae (4 spe-
cies) plant species each; Solanaceae, Poaceae,
Eurphorbiaceae, and Zingiberaceae had 3 plant species
in each family, and the remaining families had two and
one species. With regard to growth habits, the plant
species consisted of shrubs (39%), herbs and climbers
(36.6%), trees (21%) and grasses (4%).

These plant species were mainly obtained from open
grassland area (41%), garden or farms (21%), homestead
(13%) wooded grassland 11%, forest (7%) and least
number was obtained from swamps (4%) and forest edge (3%).

The most commonly mentioned plant species by
respondents were Clerodendrum umbelatum Poir (25%)
Securidaca longipedunculata Fres. (17%) while the least
mentioned among respondents includes; Crotalaria ochro-
leuca G.Don, Albizia coriaria Welw (0.9%). Fifty five per-
cent of the plant species mentioned were used to treat
more than one disease and 45% to treat only one disease.

A total of plant species documented, 25% were edible
and formed part of local diet (Table 2). Fifty five percent
of these were used in the treatment of more than one
disease while 45% were believed to treat only one parti-
cular disease. The conservation status of the medicinal
plant species is such that only 10% were cultivated and
90% were collected from the wild (Table 2).

Roots were the commonest plant parts (57%) being
used; followed by leaves (23%) (Figure 2). The most
underutilized plant part were found to be flowers with
only 2% usage, fruits making up 3% and the rest of
plant parts harvested making up 4%, 5% and 7% of
stems, seeds and bark respectively.

Records reveal that a total of 41 conditions were trea-
ted with medicinal plant parts in Otwal and Ngai sub-
counties in Oyam District. The common condition
being treated in Ngai and Otwal sub counties was found
to be abdominal pains and this was reported by 11% of
the respondents, followed by cough at 10%. Other con-
ditions such as wounds had 5.6% headache; epilepsy and
STD/STI at 4.6%. Those least mentioned at below 1%
were impotence, toothache, cholera, fever among others.
The most common way of preparing these medicinal plant species was mainly by crushing and extracting using cold water making up an overall 48%. This was followed by crushing plant parts and applied in that form at 20%. The least mode was found to be burning, and adding the ashes into bath water making up less than 1%.

On administration, oral administration through drinking was found to be the most frequently used at 69% and the least were through bathing with, massaging and smoking at less than 1%.

The main sources of indigenous knowledge of medicinal plant species were parents at 40%, grandparents at 35% (Table 3). The least sources of information about
medicinal plant species were through dreams at 3.8% and in-laws 2.9%.

The use of medicinal plant species was found to be driven mainly by its perceived effectiveness (34%), poverty, medical facilities being far (23%) and lack of medicines in hospitals (5%) (Table 4). The least use of medicinal plant species was due to referral from medical personnel (3%).

**Discussion**

The 71 medicinal plant species of cultivated and wild types were greatly utilized by people of Oyam District as herbal remedies. These plant species fall under 42 families, with the family Asteraceae having the highest number of medicinal plant species. The family Asteraceae was also recorded as having the most number of medicinal plant species as other studies in other areas also reveals [15,16]. *Clerodendrum umbellatum, Securidaca longipedunculata, Clematis hirsuta* and *Conyza sumaternsis* were among the most frequently utilized species. The frequency of mention of a given plant species could be an indication of the prevalence of a given condition it can treat and its therapeutic values.

Roots were the most commonly harvested plant part of the medicinal plants compared to any other part. This form of harvesting however, is threatening to the survival of the plant. Plant species such as *Lantana camara, Urtica massaica* had leaves and roots being harvested. Harvesting of two or more plant parts can be more damaging especially when the roots and barks/stem are harvested. Thus from the conservation point of view, the high utilization of roots of plant species in Oyam District put these plant species at a risk because of the damages inflicted on the plant species. This was also noted in other areas [6].

Many of these plant species treated more than one condition and are being used in combination. This pattern of using medicinal plant species for varying conditions was also observed among the local communities in Mabira Forest Reserve area [15]. However, it was found that locals usually mix the medicinal plant species to ensure effectiveness in treating a given ailment [17,18]. This was also observed in Ngai Sub County, where the extent of knowledge of medicinal plant mixing determined the success of a traditional healer. Medicinal plant are strongly believed by the local people of Ngai and Otwal to be effective and this among other reasons explain why they have continued to use them, thus their reliance on them for basic healthcare. This trend was also observed among the people living around Queen Elizabeth National Park in western Uganda [3,6].

Abdominal pain and cough were the most frequently treated ailments. These are diseases associated with personal hygiene. The study area has had IDP camps which was always associated with poor hygiene and overcrowding. The high frequency of mention of these diseases were directly associated with the high prevalence of these diseases in the area. This goes on to explain why many of the medicinal plant species mentioned were used for treating these ailments indicating widespread knowledge of medicinal plant species used for their treatment. For example, 25% of respondents mentioned that *Clerodendrum umbellatum* was used for treatment of abdominal pain.

The most common method of preparation of medicinal plant species before being administered was found to be applied to most plant species. This involved crushing and extracting plant materials using cold/warm water and boiling. Those that were boiled were effectively extracted compared to use of cold water, since boiling also preserves the medicine longer. Oral administration was noted as number one mode of dispensing of herbal medicine. This mode of administration was also reported elsewhere [6,18].

Some of these plant species are popular and used all over Uganda and are on sale in most markets. For instance *Cleome gynandra, Cajanus cajan, Vitallaria paradoxum, Capsicum frutescens* were found to be sources of food and were being eaten not only locally but also nationally and internationally [3].

Some studies carried out in and outside Uganda showed that some of these plant species were potent as medicine. A plant like *Aspilia africana*, is said to have high antiplasmodial activity [19]. Some other plant species mentioned elsewhere as medicine include *Cassia occidentalis* which is used in Burkina Faso as stimulant [3].

**Conservation issues**

It should be noted that a high percentage of these plant species are harvested from the wild, but with no consideration for domestication hence threatening their existence. The plant species are being overexploited and the rapid environmental degradation coupled with insurgency has put mounting pressure on the environment. This may lead to the disappearance of many species of medicinal plants of economic value. According to one of the local traditional practitioners, Okello Okiko, the use of medicinal plant species is becoming expensive since

| Table 1 Total number of respondents that were interviewed in the study area |
|-----------------------------|-----------------------------|
| Respondents                | Total                       |
| Males          | Females          |
| 64 (58%)      | 46 (42%)         | 110 |
| Age Characteristics of Respondents |
| 13-24 years  | 25-37 years  | 38-49 years  | 50 years and above |
| 17 (15%)      | 32 (29%)      | 27 (25%)      | 34 (31%)       |

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Table 2 Medicinal plants their habits, growth habit, frequency of mention, plant part used, diseases treated, methods of preparation and administration

| Family            | Taxon                                      | Habitat        | Habit | Plant part used | Disease          | Number of diseases treated | Freq of mention of plant | Methods of Preparation | Administration       |
|-------------------|--------------------------------------------|----------------|-------|----------------|------------------|---------------------------|-------------------------|------------------------|----------------------|
| Amaranthaceae     | *Pupalia lappacea* Juss. AA-49-07          | Wooded grassland | SH    | R              | Syphilis         | 1                         | 2                       | Crushed, boiled*       | Extract drunk        |
| Anacardiaceae     | *Mangifera indica* L. AA-53-07             | Homestead      | T     | B              | Diarrhoea        | 2                         | 8                       | Crushed, mixed in cold water | Extract drunk twice a day |
|                   |                                             |                |       |                |                  |                          |                         |                       |                      |
|                   |                                             |                |       |                | Cough            |                          |                         | Crushed, mixed in cold water | Extract drunk        |
| Apocynaceae       | *Canissa edulis* (Forsk) Vahl. AA-59-07    | Grassland      | SH    | R              | Epilepsy         | 2                         | 3                       | Crushed, mixed in cold water | Extract drunk        |
|                   |                                             |                |       |                |                  |                          |                         |                       |                      |
|                   |                                             |                |       |                | Abdominal pain   |                          |                         | Crushed, mixed in cold water | Extract drunk        |
| Asclepiadaceae    | *Mondia whiteii* Skeels AA-57-07           | Forest         | C     | R              | Flu, cold        | 4                         | 8                       | Crushed , mixed in cold water | Extract drunk        |
|                   |                                             |                |       |                |                  |                          |                         |                       |                      |
|                   |                                             |                |       |                | Abdominal pain   |                          |                         | Crushed, mixed in cold water | Extract drunk twice a day |
|                   |                                             |                |       |                |                  |                          |                         |                       |                      |
|                   |                                             |                |       |                | Headache, cough  |                          |                         | Picked, cleaned Chewed |                      |
| Asparagaceae      | *Asparagus africanus* Hochst. ex.A. Rich AA-48-07 | Open grassland | SH    | R              | Swollen body     | 1                         | 4                       | Crushed, mixed in cold water | Extract drunk one glass twice a day , rub on skin cuts |
|                   |                                             |                |       |                |                  |                          |                         |                       |                      |
| Asteraceae        | *Acmela canthrhiza* Delile AA-64-07        | Garden edge, road side | H    | R, L           | Cough            | 2                         | 2                       | Dried, powdered         | Extract drunk three teaspoon twice a day |
|                   |                                             |                |       |                |                  |                          |                         |                       |                      |
|                   |                                             |                |       |                | Retained placenta|                          |                         | Crushed, mixed in warm water* | Extract drunk        |
| *Biden pilosa* L. AA-47-07 | Garden                                        |                | H     | L              | Wounds           | 1                         | 3                       | Dried, powdered         | Applied on wound |
| *Echinops amplexicaulis* Oliv. AA-07-07 | Open grassland                              |                | SH    | R              | Hydrocele        | 7                         | 7                       | Crushed, mixed in cold water | Extract drunk three times a day |
|                   |                                             |                |       |                |                  |                          |                         |                       |                      |
|                   |                                             |                |       |                | Hernia scrotal   |                          |                         | Crushed, mixed in cold water* | Extract drunk       |
|                   |                                             |                |       |                |                  |                          |                         |                       |                      |
|                   |                                             |                |       |                | Stomachache      |                          |                         | Crushed , boiled        | Extract drunk 200 ml once a day |
|                   |                                             |                |       |                |                  |                          |                         |                       |                      |
|                   |                                             |                |       |                | TB               |                          |                         | Crushed, boiled         | Extract drunk quarter glass for adults twice a day , two spoonful twice a day for children |
|                   |                                             |                |       |                |                  |                          |                         |                       |                      |
|                   |                                             |                |       |                | snake bite, whooping cough, syphilis |                          |                         | Crushed, mixed in cold water | Extract drunk one glass twice a day |
| Conyza sumatrensis (Retz.) E.Walker AA-35-07 | Open grassland                              |                | SH    | L              | Wounds           | 3                         | 12                      | Crushed | Juice onto fresh wound |

Kamatenesi et al. Journal of Ethnobiology and Ethnomedicine 2011, 7:7
http://www.ethnobiomed.com/content/7/1/7
Page 5 of 14
### Table 2 Medicinal plants their habits, growth habit, frequency of mention, plant part used, diseases treated, methods of preparation and administration (Continued)

| Plant Name | Open | SH | R | Anti venom | 2 | 2 | Crushed | Rubbed on skin cuts |
|------------|------|----|---|------------|---|---|---------|-------------------|
| **Aspilia africana** C. D Adams AA-37-07 | Open grassland | Abandoned gardens, road side | **R** | Sore throat | 8 | 3 | Crushed, mixed in cold water | Extract drunk |
| **Microglossa pyrifolia** (Cam) O. Ktze AA-36-07 | Wooded grassland | **L** | Epilepsy | Crushed |  | | Used for bathing, burnt in patient room |

| **Vernonia amygdalina** Del. AA-46-07 | Open grassland | **R** | Cough | 9 | 10 | Crushed, mixed in cold water | Extract drunk |
| **L** | Abdominal pain | Crushed, mixed in cold water | Extract drunk twice a day |
| **L** | Wound | Crushed | Extract applied on wound |
| **L** | Malaria | Crushed, mixed in cold water | Extract drunk |
| **R** | Swollen stomach | Crushed, mixed in cold water | Extract drunk |
| **R** | Hernia | Dried, powdered | Extract drunk 10 ml twice a day, extract rubbed on skin cuts |
| **R** | Headache | Crushed, mixed in cold water | Extract drunk 2 spoonful thrice a day |
| **R** | STI | Crushed, mixed in cold water | Extract drunk 500 ml thrice a day |
| **R** | Diarrhoea | Crushed, mixed in warm water | Extract drunk 500 ml once a day |
| Vernonia sp. | AA-02-07 | Open grassland, garden | H | R, L | Backbone disease | 1 | 3 | Crushed, boiled, heated over fire | Extract drunk, heated leaves massage body twice a day |
| Bignoniaceae | Markhamia platycalyx | Sprague AA-54-07 | T | R | Ease child bearing, induces labour | 1 | 1 | Crushed, mixed in warm water | Extract drunk one glass once a day |
| Stereospermum kunthianum Cham. | AA-55-07 | Wooded grassland | T | R | Wounds | 1 | 1 | Dried, powdered | Applied on wound |
| Kigelia africana (Lam.) Benth | AA-60-07 | Wooded grassland | T | L | Eye disease | 3 | 2 | Crushed | Squeezed in eye |

| B | Poison antidote | Crushed, boiled | Extract drunk once a day |
| S | Impotence | Dried, powdered | Extract drunk, eaten. |

| Caesalpiniaeae | Cassia siamea Lam. AA-56-07 | Semi cultivated | T | R | Sore throat | 2 | 4 | Crushed and mixed in cold water | Extract drunk |
| | | | L | Abdominal pain | Picked, cleaned | Chewed, liquid swallowed |

| Capparaceae | Cleome gynandra L.AA-61-07 | Homestead, garden | H | L | Headache | 3 | 5 | Crushed | Rubbed on forehead |
| | | | L | Ring worm | Crushed | Rubbed on affected area |
| | | | R | Eye disease | Crushed | Dropped in eye |

| Caricaceae | Carica papaya L. AA-43-07 | Homestead | T | R | Body pain by witchcraft | 1 | 3 | Crushed | Rubbed on body twice a day |

| Celastraceae | Maytenus senegalensis (Lam) Exell AA-45-07 | Forest | T | R | Epilepsy | 2 | 1 | Crushed, mixed in cold water* | Extract drunk 50 ml three times a day |
| | | | R | Miscarriage | Crushed, mixed in cold water* | Extract drunk 300 ml two times a day |

| Chenopodiaceae | Chenopodium ambrosioides L. AA-50-07 | Around home stead | H | L | Headache | 2 | 4 | Crushed, mixed in hot water | Steam inhaled, heated leaves placed on face |
| | | | L | Epilepsy | Crushed, mixed in cold water | Extract drunk 25 ml twice a day, applied on skin cuts |

| Combretaceae | Combretum molle R.Br.G. Don AA-44-07 | Swampy area, forest edge | T | R | Cough | 1 | 1 | Dried, powdered added into one glass of water | Drunk twice a day |
| | Combretum collinum Fresen AA-42-07 | Open grassland | T | L | Cough | 4 | 12 | Crushed, mixed in cold water* | Extract drunk twice a day |
| | | | R, B | Wounds | Crushed | Juice squeezed on wound |
| | | | R, B | Diarrhoea, | Crushed, mixed in cold water | Extract drunk 4 teaspoon twice a day |
| | | | R, B | Abdominal pain | Crushed, mixed in cold water |
| Cucurbitaceae       | Cucurbita maxima Wall. AA-38-07 | Gardens, antihill | C | R | Abdominal pain | 1 | 1 | Crushed, mixed in cold water | Extract drunk |
|---------------------|---------------------------------|-------------------|---|---|----------------|---|---|-------------------------------|----------------|
| Momordica foetida Schum. AA-52-07 | Antihill | C | R | STI | 3 | 2 | Crushed, mixed in cold water | Extract drunk one glass once a day |
| Kedrostis foetidissima Cogn. AA-41-07 | Open grassland | C | R | Measles | 1 | 1 | Crushed, mixed in cold water | Extract drunk once a day |
| Dioscoreaceae       | Dioscorea sp AA-62-07 | Garden | H | L | Loss of appetite | 1 | 1 | Crushed, boiled | Eaten |
| Eurphorbiaceae      | Euphorbia hirta L. AA-71-07 | Garden, along roadside | H | R | Cough | 2 | 6 | Crushed, mixed in cold water | Extract drunk three times a day |
| Flugaea virosa (Willd.) Voigt AA-40-07 | Wooded grassland | SH | R | Miscarriage | 1 | 2 | Crushed, mixed in cold water | Extract drunk 250 ml twice a day |
| Fabaceae            | Piliostigma thomningii (Schumach.) Milne-Redh. AA-44-07 | Open grassland | T | L | STI | 2 | 6 | Crushed, mixed in cold water | Extract drunk 750 ml thrice a day |
| Cassia nigricans Vahl. AA-51-07 | Open grassland | SH | St | Wound | 3 | 2 | Crushed | Apply on skin cuts |
| L | Worms | | | | | | Crushed, mixed in cold water | Extract drunk |
| L | Stomachache | | | | | | Crushed | Smear on stomach |
| Erythrina abyssinica Lam. AA-29-07 | Grassland | T | R | Toothache | 1 | 2 | Crushed, boiled | Massage tooth |
| Labiatae            | Hoslundia opposita Vahl. AA-09-07 | Open grassland | H | R | Epilepsy | 2 | 6 | Crushed, mixed in cold water | Extract drunk two times a day, applied as nasal drop |
| L | Whole body swelling | | | | | | Crushed, boiled | Extract drunk |
| Lamiaceae           | Clerodendrum myricoides R.Br. & Vatke AA-30-07 | Open grassland | S | R | Body pains | 2 | 4 | Crushed | Rub on skin cuts |
| Ocimum basilicum L. AA-32-07 | Compound edge | H | L | Eye cataract | 3 | 3 | Crushed | Extract squeezed, dropped in eye twice a day |
| L | Fever | | | | | | Crushed, mixed in warm water | Massage body, add in bathing water |
| L | Malana | | | | | | Crushed, mixed in warm water | Extract drunk |
| Plant Name                  | Family       | Voucher Code | Class | Region        | Disorder(s)            | Frequency | Preparation Method                        | Administration Method                                      |
|-----------------------------|--------------|--------------|-------|---------------|------------------------|-----------|------------------------------------------|-------------------------------------------------------------|
| Vitex doniana               |             |              | T     | Sweet AA-25-07| Eye disease            | 1         | Crushed, mixed in cold water            | Extract dropped in eye                                       |
| *Leguminosae*               |             |              | SH    | Wooded grassland | Dysentery             | 1         | Crushed, mixed in cold water            | Extract drunk two teaspoon two a day                        |
| *Indigofera arrecta*       | *Indigofera* |              | SH    | Open garden    | Body swelling          | 4         | Crushed                                 | Rubbed on skin                                              |
|                            |              |              |       |               | Round worms            |           | Crushed, mixed in warm water            | Extract drunk one day                                       |
|                            |              |              |       |               | Headache               |           | Crushed, mixed in cold water            | Extract drunk                                               |
|                            |              |              |       |               | Sore throat            |           | Crushed, mixed in cold water            | Extract drunk twice a day                                   |
| *Acacia hockii*             | *Acacia*     |              | T     | Wild AA-24-07  | Malaria + cough        | 1         | Crushed, mixed in cold water            | Extract drunk two times a day                               |
| *Acacia sieberiana*        |              |              | T     | Wooded grassland | Epilepsy              | 2         | Crushed, mixed in cold water            | Extract drunk                                               |
|                            |              |              |       |               | Dysentery              |           | Crushed, mixed in cold water            | Extract drunk half a glass two times a day                  |
| *Loganiaceae*               |              |              | T     | Swamps        | Witchcraft             | 1         | Crushed, mixed in cold water            | Extract sprinkled on patient                                |
| *Meliaceae*                 |              |              | SH    | Grassland     | Stomachache            | 8         | Crushed, mixed in cold water            | Extract drunk 50 ml once a day                              |
|                            |              |              |       |               |                       | 6         | Crushed, mixed in cold water            | Extract drunk half glass twice a day                        |
|                            |              |              |       |               |                       |           | Dried, powdered                         | Powder added in water making 10 ml, drunk two times a day   |
|                            |              |              |       |               |                       |           | Crushed, mixed in cold water            | Extract drunk two times a day                               |
|                            |              |              |       |               |                       |           | Crushed, mixed in cold water            | Extract drunk                                               |
|                            |              |              |       |               |                       |           | Crushed, mixed in water                 | Extract drunk                                               |
|                            |              |              |       |               |                       |           | Crushed, boiled                          | Extract drunk 200 ml once a day                             |
| *Trichilia emetica*         | *Trichilia*  |              | H     | Open grassland | Snake bite             | 3         | Crushed, mixed in cold water            | Extract drunk, crushed leaves rubbed on skin cuts           |
|                            |              |              |       |               | Stomachache            |           | Crushed, mixed in cold water            | Extract drunk once a day                                    |
|                            |              |              |       |               |                       |           | Crushed, mixed in cold water            | Extract drunk                                               |

Kamatenesi et al. *Journal of Ethnobiology and Ethnomedicine* 2011, 7:7
http://www.ethnobiomed.com/content/7/1/7
Page 9 of 14
| Botanical Class | Scientific Name | Common Name | Propagation Method | Plant Part Used | Plant Habit | Frequency of Mention | Disease Treated | Preparation Method | Administration Method |
|----------------|----------------|-------------|--------------------|-----------------|-------------|----------------------|----------------|-------------------|---------------------|
| Menispermaceae  | Cissampelos mucronata A.Rich. | Garden edges | H | R | Abdominal pain | 1 | Crushed, mixed in cold water | Extract drunk three times a day |
| Mimosaceae     | Albizia conana Welw. AA-58-07 | Wooded grassland | T | B | Diarrhoea | 1 | Crushed, mixed in cold water | Extract drunk |
| Moraceae       | Ficus vallis Chaude AA-20-07 | Wooded grassland | T | R | Dysentery, diarrhea | 3 | Crushed, mixed in cold water | Extract drunk half glass once a day |
| Musaceae       | Musa spp AA-60-07 | Garden | T | F | Diarrhoea | 3 | Crushed, mixed in cold water | Extract drunk |
| Myrtaceae      | Eucalyptus globulus Labill. AA-68-07 | Home stead | T | L | Cough | 5 | Crushed, boiled | Eaten |
| Papilionaceae  | Cajanus cajan (L.) Druce AA-17-07 | Garden | SH | L | Stomachache | 1 | Crushed, mixed in cold water | Extract drunk 100 ml once a day |
| Poaceae        | Imperata cylindra P'Beauv. AA-67-07 | Open grassland | G | R | Abdominal pain | 1 | Crushed, mixed in cold water | Extract drunk |
| Ranunculaceae  | Clematis hirsuta Guill. & Perr. AA-05-07 | Anthill on Open grassland | H | R | Swelling | 4 | Crushed | Massage affected area |

Kamatenesi et al. *Journal of Ethnobiology and Ethnomedicine* 2011, 7:7

http://www.ethnobiomed.com/content/7/1/7

Page 10 of 14
| Family       | Genus                          | Habitat                | Part Used   | Disease          | Preparation                                      | Administration               |
|-------------|-------------------------------|------------------------|-------------|------------------|-------------------------------------------------|------------------------------|
| Rubiaceae   | Sarcocephalus latifolius      | Grassland SH R         | Piles       | 8                | Burnt together with millet husk                  | Direct smoke to anus         |
|             | (SM.) Bruce AA-51-07          |                        | R           | Scrotal hernia   | Crushed, mixed in cold water                    |                              |
|             |                               |                        | R           | Cough, stomachache | Crushed, boiled                               | Extract drunk 200 ml once a day |
|             |                               |                        | R           | STDs, worms      | Crushed, boiled                                 | Extract drunk one glass twice a day |
|             |                               |                        | R           | Diarrhoea        | Crushed, mixed in cold water                    | Extract drunk half glass thrice a day |
|             | Vangueria apiculata           | Forest edge S Swollen feet | 1 | R Cough, stomachache | Crushed, mixed in cold water                    |                              |
|             | K. Schum AA-16-07             |                        | 1           |                  |                                                 |                              |
|             | Sapotaceae                    | Wooded grassland T B   | Diarrhoea   | 1                | Dried, powder mixed in warm water               | Drunk 20 ml two times a day  |
|             | Vitallaria paradoxum          |                        |             |                  |                                                 |                              |
|             | (C.F. Gaertn) Hepper AA-14-07 |                        |             |                  |                                                 |                              |
|             | Simaroubaceae                 | Ant hills SH R Worms   | 2 | R Worms          | Crushed, mixed in warm water                    | Extract drunk 500 ml a day   |
|             | Harrisonia occidentalis       |                        |             |                  |                                                 |                              |
|             | (Eng) L.AA-15-07              |                        |             |                  |                                                 |                              |
|             | Solanaceae                    | Under big trees SH S   | Backache    | 1                | Crushed                                          | Crushed bark rubbed on skin cuts |
|             | Capsicum frutescens           |                        |             |                  |                                                 |                              |
|             | Rodsch. AA-13-07              |                        |             |                  |                                                 |                              |
|             | Solarum sp AA-10-07           | Ant hills open grassland |             |                  |                                                 |                              |
|             | Solanum aculeatissimum        | Homestead SH R         | Witchcraft  | 5                | Crushed                                          | Rub on skin cuts             |
|             | Jacq AA-28-07                 |                        |             |                  |                                                 |                              |
|             |                               |                        |             |                  |                                                 |                              |
|             |                               |                        |             |                  |                                                 |                              |

*Note: F - Female, M - Male, SH - South, S - South and West, T - Town, R/F - Rural and Forest.*
Table 2 Medicinal plants their habits, growth habit, frequency of mention, plant part used, diseases treated, methods of preparation and administration (Continued)

| Family                | Species Name                        | Collection Site | Habit       | Frequency | Plant Part Used | Preparatory Method | Administration Method |
|-----------------------|-------------------------------------|-----------------|-------------|-----------|-----------------|---------------------|-----------------------|
| Tiliaceae             | Grewia mollis Juss. AA-70-07         | Open grassland  | T R Swollen | 1 1       | Scraped         | Plastered on swelling |                      |
| Tricholomataceae      | Termiteomyces microcarpus AA-71-07   | Forest          | R Boils     | 1 1       | Crushed         | Smeared on affected area |                      |
| Umbelliferae          | Steganofaenia oraliacea AA-63-07     | Open grassland  | SH R Measles | 2 2       | Crushed         | Rubbed all over skin |                      |
|                       |                                     |                 |             |           |                 |                     |                       |
| Urticaceae            | Urtica massaica Mildbr. AA-08-07     | Forest, swamp   | SH L Headache | 4 4       | Crushed         | Rubbed on forehead |                      |
|                       |                                     |                 |             |           |                 |                     |                       |
| Verbenaceae           | Lanatana camara Mildbr. AA-03-07     | Garden edge, roadside | SH L Ringworms | 4 5       | Dried, powdered | Smear on affected area |                      |
|                       |                                     |                 | L Cataracts |          | Crushed         | Extract dropped in eye |                      |
|                       |                                     |                 | R snake bite |          | Crushed         | Extract drunk 250 ml |                      |
|                       |                                     |                 | R Epilepsy |          | Crushed         | Extract drunk |                      |
|                       |                                     |                 |             |           |                 |                     |                       |
| Vitaceae              | Cyphostemma adenocaule Descoings. ex Wild & R.B. Drummm. AA-01-07 | Open grassland  | C R Wounds | 4 3       | Sap collected   | Rubbed on skin cuts   |                      |
|                       |                                     |                 |             |           |                 |                     |                       |
|                       |                                     |                 | R Abortion |          | Crushed         | Extract drunk three a glass |                      |
|                       |                                     |                 | R Boils    |          | Crushed         | Extract smeared on affected area once |                      |
|                       |                                     |                 | R Cough    |          | Crushed         | Extract drunk |                      |
|                       |                                     |                 |             |           |                 |                     |                       |
| Zingiberaceae         | Zingiber officinale Roscoe AA-34-07  | Homestead       | H R Meningitis | 2 4       | Crushed         | Rubbed on skin |                      |
|                       |                                     |                 |             |           |                 |                     |                       |
|                       |                                     |                 | R Cough    |          | Crushed, warm water added | Drunk |                      |
some of the plant species are hard to find and one has to risk going to restricted conservation areas to get the plant species. Since the knowledge comes at a price, many people are even too poor to pay for the herbalist services, hence a reduction in number of clients.

The disappearance of medicinal plant species can also be attributed to over use, agricultural activities and insecurity. Domestication of medicinal plant species is probably not taken seriously. Some medicinal plant species which have been proved potent have been over used [4,20]. The mode of harvesting which involves the use of roots also posed a threat to the existence of these plant species. In most of the plant species, their roots were being used.

**Conclusions**

The 71 medicinal plant species of cultivated and wild types were greatly utilized for treating a total of 41 different ailments by people of Ngai and Otwal Sub Counties. Thirty nine percent of the recorded plant species were reported for treating stomach related ailments. The most commonly mentioned plant species by respondents were *Clerodendrum umbellatum* Poir (25%). Of the total of plant species documented, 25% were edible and formed part of local diet. The main sources of indigenous knowledge of medicinal plant species were parents at 40%.

Roots were the most commonly harvested plant part of the medicinal plant species compared to any other part. The most common method of preparation of medicinal plant species before being administered was found to be applied to most plant species. However, it was noted that some of these medicinal plant species are disappearing very first. The disappearance of medicinal plant species can be attributed to over use, agricultural activities and insecurity. Domestication of medicinal plant species is probably not taken seriously.

The use of medicinal plant species in primary health care is still a common practice in Ngai and Otwal Sub-County. The inadequate health services and abject poverty still make these people dependent on herbal medicine for their day to day health needs.
The generation gap caused by the over 20 years of insurgency in the area has brought about knowledge gap between the young and the old with regard to medicinal plant species.

Recommendations
- There is need for ex-situ conservation of the useful medicinal plant species.
- There is need for community awareness and education concerning the values of medicinal plant species of the area especially among the young people.
- Further studies should be done on the medicinal plant species to determine their pharmacological potentials.
- Government should develop policy to integrate use of medicinal plant species in health care at national level.

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Author details
1Department of Botany, Makerere University, P.O Box 7062, Kampala, Uganda.
2Institute of Environment and Natural Resources Makerere University, P.O Box 7062, Kampala, Uganda.

Authors’ contributions
AA identified the research area and title, collected field data, carried out statistical analysis and drafted the manuscript. MMK and OOH participated in refining the title, formulation of the research problem, data analysis and drafting as well as enrichment of the manuscript. All authors read and approved the final manuscript.

Competing interests
The authors declare that they have no competing interests.

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References
1. WHO: Mental health Global Action Program (mhGAP) World Health Organization, Geneva, Switzerland, 2002.
2. Tabuti Robert SR Locally used plant species in Bulamogi County, Uganda diversity, modes of utilisation. PhD thesis Agricultural University of Norway, 2003.
3. Kamatenesi MM, Makawiti DW, Oryem-Origa H, Olwa-Odyek E. Ethnopharmacological screenings of Vernonia amygdalina and Cleome gynandra traditionally used in child birth in Western Uganda. Edited by: Midivo JD, Yenesew Abjy, Derese-Solomon 2005, 81-89, the proceeding of the 11th NAPRECA Symposium on natural products and drug discovery, 9-12 Antananarivo.
4. World Health Organization: Traditional Medicines Strategy 2002-2005. Geneva, 2002.
5. Kature E, Waako P, Ogwal-Okeng J, Bukunya-Ziraba R: Traditional treatment of malaria in Mbarara District, western Uganda. African Journal of Ecology 2007, 45(Suppl. 1):48-51.
6. Kamatenesi MM, Oryem-Origa H: Medicinal plant species used to induce labour during childbirth in western Uganda. Journal of Ethnopharmacology 2005, 109:1-9.
7. Kature E, Waako P, Ogwal-Okeng J, Bukunya-Ziraba R: Traditional treatment of malaria in Mbarara District, western Uganda. African Journal of Ecology 2007, 45(Suppl. 1):48-51.
8. Rufia Sanago: Analgesic and anti-inflammatory activities of the aqueous extracts of Maytenus senegalensis, Sterospermum kunthianum and Trichilo emetico used in the treatment of dysmenorrhea in Mali (abstract). The 12th NAPRECA Symposium 2007, 40.
9. Tsey Komla: Traditional medicine in contemporary Ghana: A public policy analysis. Social Science & Medicine 1997, 45:1065-1074.
10. Enopoba A, Odeleye M, Ogungyemi CM: Traditional medicine development for medical and Dental primary health care delivery system in Africa. Afr J Traditional, Complementary and Alternative Medicine 2005, 2(1):46-61.
11. Ibe AE, Nwufuo Martin I: Identification, Collection and Domestication of Medicinal Plant species in Southeastern Nigeria. Africa Development 2005, 30:66-77.
12. Oyam District Achievements One Year of Development - June 2006 - May 2007. (http://www.enteruganda.com/brochures/oyam05.htm).
13. Oyam District. [http://en.wikipedia.org/wiki/Oyam_District].
14. Martins GJ: Ethnobotany: A method Manual London: Chapman and Hall, 1995.
15. Oryem-Origa H, Kature E, Kakudidi EKZ: Ethnobotanical studies of Mabira forest area, central Uganda. African Academy of Science Special Edition 2002, 169-181.
16. Akerreta Silvia, Cavero Yolanda Rita, Calvo Isabel Maria: First comprehensive contribution to medical ethnobotany of Western Pyrenees. Journal of Ethnobiology and Ethnomedicine 2007, 3:26.
17. Okello J, Siegawa P: Medicinal plant species used by communities of Ngai Sub county, Apac District, northern Uganda. African Journal of Ecology 2007, 45:76-83.
18. Bhattacharai Shandesh, Chaudhary Pram, Quave LCassandra, Taylor SLRobin: The use of medicinal plant species in the trans-himalayan arid zone of Mustang district, Nepal. Journal of Ethnobiology and Ethnomedicine 2010, 6:14.
19. Waako P, Kature E, Smith P, Folb P: East Africa medicinal plant species as a source of lead compounds for development of new antimalarial drugs. African Journal of Ecology 2007, 45(Suppl. 1):102-106, 5.
20. Alexis Okeowo: “Sex tree”, other medicinal plant species near extinction in Uganda. National Geographic News 2007.

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