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Medicinal plants use in and around kalinzu central forest reserve, Western Uganda

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Abstract
This study assessed medicinal use, diversity, and conservation techniques for plant species used in the treatment of various ailments among the local communities living around Kalinzu Central Forest Reserve in Western Uganda. The objectives of the study were: (1) to assess the diversity, use, and conservation of medicinal plants in and around Kalinzu Central Forest Reserve; and (2) to evaluate the importance of medicinal plants to communities surrounding the tropical forest. Plant species were identified and their distinctiveness such as their mode of extract preparation, parts used, and ailments treated documented. In-situ study and information on plant species was obtained by using transects or quadrant methods, Semi-structured questionnaires and interviews. Eighteen (18) plant species belonging to thirteen (13) families and sixteen (16) genera were identified by local communities for medical purposes. The utilization and preference of plant products included fruits, vegetables, medicines, fire wood, construction materials, and other purposes as 76.7% of the local people use the forest as a source for medicines. Shannon Weiner Index, H' = 2.554 and Species Evenness, E_H = 0.8836 were calculated. These values indicated uneven distribution of medicinal plant species especially in areas where there is no replacement. Adherence to traditional norms and cultures, inadequate medical services and other health care services put medicinal plants at the centre of basic primary health care. This has made it difficult to effectively implement conservation measures in Kalinzu central forest reserve due to the high dependencies on the forest products by the surrounding communities.

Keywords: floristic parts, medicinal plants, species diversity, species evenness, species richness

Introduction
Traditional medicines derived from plants have not only played a role in providing healing of various ailments, but have also contributed to the discovery of most pharmaceutically active substances in plants Bako *et al.*, (2005) [2]; Cunningham A. (1996) [4] which have been used in the commercial production of modern medicines. Medicinal plants are an integral part of the African healthcare system since time immemorial and still play an important role in healthcare system in African countries Mahomoodally and Chintamunnee, (2012) [10]. A large population in developing countries (estimated at 90%) depends on the use of medicinal plants to meet their primary health care WHO, (2002) [17]. However, in recent years, forests have been viewed as a source of national revenue with timber as the prominent product. Past research findings indicate that the biodiversity in natural forests is threatened by human activities such as deforestation, settlement, and land clearance for agriculture, industrialization, urbanization and unsustainable harvesting of non-timber products Robins, (2000) [14]. There is no enough recorded information generalizing the use and conservation of most medicinal plant species, a factor that threatens these species to extinction.
Traditional medicines and pharmaceuticals derived from forests currently play an important role in the Primary Health Care (PHC) of millions of people Worldwide Tabuti *et al.*, (2003) [15]; Bukenya-Ziraba *et al.*, (1997) [3]. Apart from the importance of medicinal plants in the primary health care systems of local communities, medicinal plants improve the economic status of local people involved in market sales Ticktin and Johns, (2002) [16]; Robbins, (2000). However, deforestation, over-grazing, over harvesting and bush burning, have contributed to depletion of different useful plant species Kasoma and Pomeroy, (1995) [8].
Maikhuri (1998) [9] reported that the biggest numbers of plants collected in natural forests are in the category of medicinal and aromatic plants. The most species rich medicinal plant families include *Fabaceae*, *Asteraceae* and *Lamiaceae* Okello and Ssegawa, (2007) [13]; Najma

– Dharani, (2002) [12]; Kakudidi *et al.*, (2000) [6]. In traditional medicine, different plant parts are used to treat different diseases and are prepared in various ways and the modes of preparation and application differ from one healer to another Okello and Ssegawa, (2007) [13]. For medicinal purposes, plant leaves, stems, barks, fruits, and roots are often used. This is smeared, rubbed, drunk or the patient is smoked. The degree of distribution and disturbance of the species population and vulnerability depends on the demand and supply, the part used and the life span of the scarce slow growing forest species (Robbins, 2000). The kind of harvesting technique is important in the use and conservation of medicinal plants, as some may be destructive Okello and Ssegawa, (2007) [13]; Muhumuza and Byarugaba (2008) [11]. The objectives of this study were: (1) to assess the diversity, use and conservation of medicinal plants in and around Kalinzu central forest reserve; and (2) to evaluate the importance of medicinal plants to communities surrounding Kalinzu central forest reserve. The study of local knowledge about natural resources is becoming increasingly important in defining strategies and actions for conservation or recuperation of residual forests Jeruto, *et al*, and (2007) [5].

Materials and Methods

Location of the Study Area

Kalinzu is a natural forest located in Busheyi District 10 kilometres west of Ishaka Town on the main Mbarara - Kasese Highway in Western Uganda. Bushenyi district lies between latitudes 0.2^0 and 0.5^0 South of the equator and longitudes 25.8^0 and 30.7^0 East of the green wich meridian (Fig.1). Pitched on top of an escarpment on the eastern edge of the Great Albertine Rift Valley, the forest reserve is 147 Sq.km and is adjacent to Queen Elizabeth National Park and the Imaramagambo Forest.

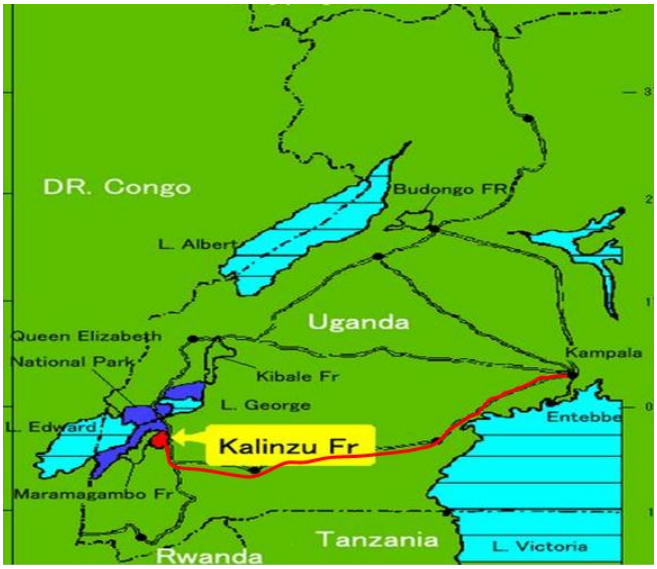

Fig 1: Map of Uganda showing the location of Kalinzu Central Forest Reserve, Bushenyi District

Plant Sampling

Ethno-botanical information on wild and cultivated plant species used for medicinal purposes was collected through interviewing 200 respondents from communities living around Kalinzu forest reserve. In order to establish suitable representative samples from the communities living in and around Kalinzu central forest reserve, respondents from households were selected through stratified sampling in which a respondent was picked after every four households, unless a key informant was identified in the study area. Six transects were made into the forest and each line transect was 1000metres, with rectangular sample plots of dimensions 30 by 15 (m^2) in area along the main line transect, separated by a distance of 10m x10m from one plot to another. These were located with the help of grid co-ordinates and marked by flagging tapes and coloured crayons Tchouto *et al*., (2004). A total of 48 rectangular plots, covering 21,600m^2 were established, and at interval distances of 2.4 km from one line transect to another (Fig. 2).

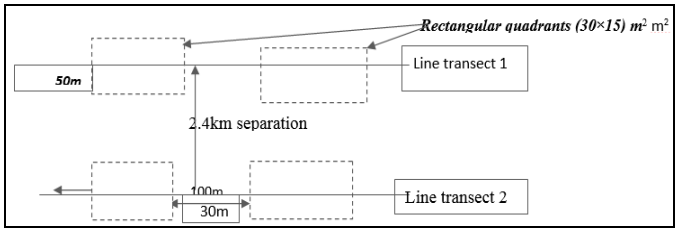

Fig 2: Transect line and Quadrants

Determination of Sample Size of Respondents

Sample size was determined using the formula $n = T^2 (P) (1-P) / C^2$, Where n = required sample size, T = confidence interval at 95%, P = percentage of picking a choice (proportion using medicinal plants of 0.82), C = confidence interval of 5% (standard value 0.05). Therefore, n = 225 respondents. Hence, a sample size of 225 respondents in all villages was to produce data used in this study. These were divided into 190 household members from the local population, 15 Traditional Medicinal Practitioners (TMPs), 5 Traditional Birth Attendants, 5 Traditional healers, and 10 Medical health workers. Other key respondents included the medicinal plants herbal research clinics such as Kazire Herbal Research Clinics in Ishaka town in Bushenyi District. Using a tape measure and flagging tapes, 8 rectangular sample points of (30 x 15)m^2, separated from each other by a distance of 100metres were made a long each transect and flagging tapes were used to mark the sample points. Tags were used to mark voucher specimens in duplicate and deposited into collection bags.

Data Analysis

Determining Importance Value Indices (IVIs)

Medicinal plants species were studied in a systematic manner using regular patterns of movement within sample plots along line transect Tchouto *et al*., (2004). The recording and location of identity of individual species was done in data sheets, together with determining the diameter at breast height (dbh) of specimens. Fresh specimens were given marked tags and put into collection bags; these were later pressed carefully and dried under sunshine and were later transported to the Makerere University herbarium for identification. For every species, the following values were determined: (a) percentage of species, which is the number of individuals of a species divided by the total number of all species observed in the study area, expressed as a percentage; (b) relative density, which is the number of individuals of a species divided by the total density of all species; (c) relative dominance, which is the total basal area of a species divided by the combined basal area of all species; (d) relative frequency of species, which is the frequency of species in the study area divided by the sum of all species frequencies observed in the area.

$$\text{(a) \% of species} = \frac{\text{Number of species}}{\text{Total number of all species in the area}} \text{ X } 100\%$$

$$\text{(b) Density} = \frac{\text{Number of a species in the area}}{\text{Total area sampled}}$$

$$\text{(c) Dominance of species} = \frac{\text{Total basal area of species}}{\text{Canopy cover of species}} \text{X } 100\%$$

Where: - Basal area = (diameter of canopy x base diameter x height), and Canopy cover = π d, where d is the diameter of canopy cover.

Species Diversity Indices (SDIs)

$$\text{(i) Species richness (S)} = \frac{\text{Number of species in the area}}{\text{Total ecosystem area sampled}}$$

(ii) Species Evenness (E_H) =H'/lnS; Where H'=Shannon Diversity Index, lnS= natural log of species richness.

(iii) Shannon Diversity Index (H')

$$H' = -\sum_{i=1}^{S}(p_i \ln p_i)$$

Where pi = n/N, is the fraction of individuals belonging to the i^{th} species, lnpi = the natural log of pi and n = the number of individual species observed.

Results

Medicinal Plant Species in and Around Kalinzu Central Forest Reserve (Uses, Life Forms, Diversity, and Conservation)

The local names (Runyankole) of plants and uses were determined and the plant life forms classified as trees (50%), herbs (27.2%), shrubs (20.7)%, and grasses (2.1%) were recorded (Table 1). Plants were mainly used for medicinal, food and other purposes such as ornamental, cultural, and aesthetic uses. Tree species mostly existed in the uncultivated forest areas while herbs, shrubs, and grass species were mainly found in the degraded areas. There was an indication that most medicinal plant species were native or indigenous of tropical forest environments, with the exception of a few cultivated species that were alien to the area (Table 1).

A total of 18 medicinal plant species were categorized by families in the parishes of Swazi, Kishunju, Kyamuhunga, Butare, Kayanga, and Mashonga during the excursions into Kalinzu central forest reserve. Medicinal plant species treat either one or more diseases or unique and /or similar (cross-cutting) ailments. This meant that some species work best when mixed together during preparation of extracts or infusions. In some circumstances, concoctions had common methods of preparation, while others could differ in their methods of preparation and applications (Table 2).

Results on medicinal plant parts harvested and used for treatment of diseases were documented, with leaves making the greatest part used as medicine (42.5%), the bark (30%) and the roots were least applied for medicines (20%) as shown in Table 2. Medicinal plants were used to treat many kinds of diseases such as sexual disorders, fevers, pressure, digestive disorders, Sexually Transmitted Diseases (STDs) and common colds, to mention but a few. Results show that in traditional medicine, different plant parts are used to treat various diseases and ailments, although the mode of preparation and application differ from one species to another and also from one healer to another Ssegawa and Okello, (2007) [13]. Flowering plants occur in many families, with some of the families having more medicinal plant species than others (Table 3). Species rich medicinal families include *Fabaceae, Lamiaceae* and *Asteraceae.* Similar results were obtained by Akash, *et al.,* (2014); Kakudidi *et al.,* (2000) [6]; Muhumuza and Byarugaba (2008) [11]; Okello and Ssegawa (2007) [13]; and Kamatenesi – Mugisha (1997) [7].

Table 1: Medicinal plant species with respect to their families, uses, growth habits, habitat distribution and origin

Plant family	Botanical name	Local name	Uses			Growth form	Habitat			Origin	
			Med	Food	Others		NC	CU	BWC	Nat	Alien
Leguminosae	*Albiza coriaria Oliv.*	Omusisa	√	x	√	Tree	√	x	x	√	x
Poaceae	*Cymbopogon citrates*	Kalifuha/ Omuteete	√	√	√	Grass	x	√	x	x	√
Meliaceae	*Azaradirachta indica*	Niimu	√	√	√	Tree	x	√	x	x	√
Fabaceae	*Erythrina abyssinica*	Omuko	√	x	√	Tree	√	x	x	√	x
Chenopodiaceae	*Chenopodium ambrosioides*	Kifaru	√	x	x	Herb	x	√	√	√	x
Euphorbiaceae	*Euphorbia hirta*	Kamaramahano	√	x	x	Shrub	x	√	√	√	x
Bignoniaceae	*Spathodea campanulata*	Omunyara/ Ekifabakazi	√	x	√	Tree	√	√	√	√	x
Moraceae	*Ficus natalensis*	Omutoma	√	x	√	Tree	√	x	x	√	x
Fabaceae	*Senna didymobortrya*	Omugabagaba/ Omukyola	√	x	√	Tree	√	√	√	√	x
Canellaceae	*Warburgia ugandensis*	Omukuzanyana/ Ekikuzanyana	√	x	√	Tree	√	x	x	√	x
lamiaceae	*Ocimum suave W*	Omujaja	√	√	√	Shrub	x	√	x	√	√
Moringaceae	*Moringa oleifera*	Muringa	√	√	√	Tree	x	√	x	x	√
Compositae	*Vernonia amygdalina*	Omubirizi	√	x	√	Tree	√	√	√	√	x
Lamiaceae	*Hoslundia opposite*	Orutotoima	√	x	x	Shrub	√	x	x	√	x
Euphorbiaceae	*Ricinus communis*	Ensogasoga	√	√	√	Shrub	√	√	√	x	√
Liliaceae	*Aloe ferox*	Rukaka	√	√	x	Shrub	x	√	x	√	√
Basellaceae	*Basella alba*	Enderema	√	√	√	Herb	√	x	x	√	x
Lamiaceae	*Leonotis nepatae-folium*	Ekicumucumu	√	x	x	Herb	√	x	x	√	x

Key: √ = Applicable, x = Not applicable, NC= Uncultivated, CU= Cultivated, BWC= both wild and cultivated, Nat=Native/ Indigenous, Med=Medicine

Table 2: Medicinal plant species abundances, density and Dbh, parts harvested and diseases/ailments treated

Plant family	Botanical name	Species (%)	Density	dbh/cm	Parts harvested						Diseases / ailments treated
					Roots	stem	Leaves	Bark	Flower	Seeds	
Leguminosae	*Albiza coriaria Oliv.*	3.2	0.28	179.6	√	●	√	√	●	●	sore eyes, strong cough/ tuberculosis, skin disease e.g. ring worms, stomach ulcers, syphilis, constipation/ stomachache
Poaceae	*Cymbopogon citrates*				√	●	√	●	●	●	Light form of malaria, Bronchitis / sinusitis, Digestive disorders, Bad smell breath, Joint pains, Stimulate eating meat, Depression
Meliaceae	*Azaradirachta indica*	1.6	0.14	39.8	●	●	√	√	√	√	Malaria fever, Abdominal pain, Infected burns, Diarrhoea and dysentery, Worms, Ear pain, Gum bleeding, Scabies, Eczema
Fabaceae	*Erythrina abyssinica*	3.8	0.32	109.9	√	●	√	√	√	●	Gonorrhea and syphilis, Inflammation of eyelids, Burns, Worms, Gastric ulcers, Dysentery, Fresh cuts.
Chenopodiaceae	*Chenopodium ambrosioides*	3.8	0.32	-	√	●	√	●	√	●	Worms, Constipation, Stops vomiting, Headache, Stopping night mares, Psychotic excitement and epilepsy, Spasmodic cough and asthma, Chest pains
Euphorbiaceae	*Euphorbia hirta*	2.7	0.23	-	√	√	√	√	√	√	Amoebic dysentery, Diarrhea, Asthma, Intestinal worms, Common cold, Urinary infections and kidney infections, Anxiety.
Bignoniaceae	*Spathodea campanulata*	5.9	0.5	125.2	√	●	●	√	√	√	Heals dryness in women, Worms, Uterus (wounds and swellings), Backache, Stomachache, Headache, Body rashes, Ear pains.
Moraceae	*Ficus natalensis*	6.5	0.56	73.2	√	●	√	√	●	●	Cough, influenza, Dysentery, Wounds, Pimples, Stimulates pregnancy, Cholera / diarrhea, Stops nose bleeding, Impotence in men, High blood pressure, Headache / backache, Stop vomiting
Fabaceae	*Senna didymobortrya*	7.6	0.65	12.7	√	●	√	√	●	●	Fever, Sickle cells, Constipation, Gonorrhea and syphilis, Ring worms, Measles, Stomachache, Asthma, Appetizer
Canellaceae	*Warburgia ugandensis*	6.5	0.56	160	●	√	√	√	●	●	Memory loss, Worms, Body pain, Headache, Pneumonia, Tuberculosis, Ulcers (mouth, stomach), Gastroenteritis, Kidney stone elimination, Constipation, Ear pain, Prevents diarrhea, Epilepsy.
lamiaceae	*Ocimum suave W*	3.2	0.28	0.2	√	√	√	√	●	●	Red and sore eyes, Stomach upset, Cold and blocked nose, Ear pain, Loss of appetite, Cough, Toothache, Bad smelling breath, Flu, Constipation.
Moringaceae	*Moringa oleifera*	1.1	0.09	17.7	√	●	√	√	√	√	Appetizer, Gastric ulcers, Diuretic / kidney problems, Sore throats, Headache / ear pain / mouth ulcers, Anti stress / high blood pressure, Anti – cholesterol
Compositae	*Vernonia amygdalina*	14	1.20	14.1	●	●	√	√	●	●	Malaria fever, Measles, Worms, Bilharzias, Constipation, Abdominal pain, Diarrhea, Asthma, Spots on the skin, Appetizer
Lamiaceae	*Hoslundia opposite*	5.4	0.46	0.7	√	●	√	●	●	●	Abdominal pain, induces labour in women, Diarrhea, dysentery, reduces Menstral pain, Vaginal sores/ Internal injury after birth
Euphorbiaceae	*Ricinus communis*	16	1.39	11.1	√	●	√	●	●	√	Appetizer, Ulcers and stomachache, Diarrhea, Skin infections / burns, Constipation, Cough, Measles, Headache / backache
Liliaceae	*Aloe ferox*	3.2	0.28	-	√	√	√	√	●	●	Constipation, Conjunctivitis, Skin infections, Wounds or ulcers, Burns, stops menstral flow, Diarrhea, induces labour in women
Basellaceae	*Basella alba*	5.9	0.50	0.40	●	√	√	●	●	●	Measles, Gastritis, Cough / flu, Ulcers, Heart problems / pressure, Diarrhea & dysentery, Worms, Headache, Anemic conditions
Lamiaceae	*Leonotis nepatae-folium*	5.4	0.46	0.5	√	√	√	●	●	●	Diarrhea, Dysentery, Fevers, Wound healing, Stomach ulcers, Cholera, Stomach pains, Worms, Headache, Anemic conditions

Key: (√) part is used, (●) = part is not used

Table 3: Shannon Diversity Index (SDI or H'), species richness (S) and evenness of distribution of species (EH), (n=18)

Botanical name	Family	Major Transects into Kalinzu forest						Total	Mean	Pi	Ln Pi	PilnPi
		T1	T2	T3	T4	T5	T6					
Aloe ferox	*Liliaceae*	0	1	0	0	3	2	6	1.71	0.03	-3.36	-0.117
Euphorbia hirta	*Euphorbiaceae*	0	0	1	2	2	0	5	1.43	0.03	-3.54	-0.102
Hoslundia opposite	*Lamiaceae*	6	0	2	1	0	1	10	2.86	0.06	-2.85	-0.165
Warburgia ugandensis	*Canellaceae*	2	5	4	1	0	0	12	3.43	0.07	-2.67	-0.185
Chenopodium ambrosioides	*Chenopodiaceae (USDA Plants)*	0	4	1	0	0	2	7	2.00	0.04	-3.21	-0.129
Ocimum suave W	*lamiaceae*	3	1	0	0	1	1	6	1.71	0.03	-3.36	-0.117
Senna didymobortrya	*Fabaceae*	4	1	6	0	3	0	14	4.00	0.08	-2.51	-0.203
Vernonia amygdalina	*Compositae*	2	5	5	7	1	6	26	7.43	0.15	-1.89	-0.285
Cymbopogon citrates	*Poaceae*	0	0	0	0	0	0	0	0.00	0.00	0.00	0.000
Spathodea campanulata	*Bignoniaceae*	4	1	1	5	0	0	11	3.14	0.06	-2.76	-0.175
Basella alba	*Basellaceae*	1	0	4	6	0	0	11	3.14	0.06	-2.76	-0.175
Erythrina abyssinica	*Fabaceae*	0	0	3	2	0	2	7	2.00	0.04	-3.21	-0.128
Ricinus communis	*Euphorbiaceae*	8	4	3	5	6	4	30	8.57	0.17	-1.75	-0.304
Leonotis nepatae-folium	*Lamiaceae*	1	3	0	5	0	1	10	2.86	0.06	-2.85	-0.16
Ficus natalensis	*Moraceae*	2	2	0	5	0	3	12	3.43	0.07	-2.67	-0.185
Moringa oleifera	*Moringaceae*	0	0	0	0	0	0	0	0.00	0.00	0.00	0.000
Albiza coriaria Oliv.	*Leguminosae*	1	0	2	0	3	0	6	1.71	0.03	-3.36	-0.117
Azaradirachta indica	*Meliaceae*	0	0	0	0	0	0	0	0.00	0.00	0.00	0.000
Shannon diversity index (SDI)											Or H'	2.554
Species richness (S)												49.43
Species evenness (EH)												0.8836

Discussions

Eighteen (18) medicinal plant species were identified and these were harvested from both the wild (Kalinzu forest) and cultivated in gardens. The medicinal plant species identified (Table 2) have been in use since the last century and knowledge of their use is largely based on traditional or cultural norms, inherited from grand-parents to the current generations. Out of the identified number of medicinal plant species in and around Kalinzu forest, three plant species belong to the family *Fabaceae*, three are of the family *Lamiaceae*, two were of the family *Euphorbiaceae*, and the rest had one species identified; *Poaceae ex Gramineae, Meliaceae, Chenopadiaceae, Bignoniaceae, Moracae, Canallaceae, moringaceae, asteraceae, liliaceae and menispermaceae* (Table 1).

The medicinal plant species studied were grouped into three growth or life forms, namely trees (50%), herbs (22.2%) and shrubs (27.8%). Local people use medicinal plant species to treat many diseases such as birth difficulties, sexually disorders, digestive problems, fevers, heart problems, headache, backache, sexual transmitted diseases, and skin infections (Table 1). These plant species are harvested either by hand plucking, using pangas, hoes for roots or general uprooting of the plant. Herbal medicines were administered in various ways and forms, but mainly through liquid concoctions or infusions. Most of the treatments involved use of leaves (42.5%) and bark (30%). Most medicinal plant species were found to treat more than one disease and different parts of the same plant species could heal different diseases. Methods of processing or preparing the medicinal herbs (concoctions, powder, or infusions) could differ in quantity and conditions from one species to another.

According to the traditional healers in the study area, medicines prepared by combining two or more plants (mixture of concoctions, powder or infusions) are more potent than those prepared with a single plant. This has been attributed to the combined effects or medicinal ingredients of various plants Okello and Ssegawa, (2007) [13]. Medicinal plant species such as *Ficus natalensis, Spathodea campanulata, Aloe ferox, Albizia coriaria, Moringa oleifera, Vernonia amygdalina*, and *Erythrina abyssinica* (Table 1) were found to treat more diseases as compared with other species. This was because all the species identified could treat more than 2 diseases, and this indicated a high resemblance in the type (s) of diseases treated by different plant species (Table 2). Knowledge of use and processing of herbal medicines was high in people of age bracket (46-55) and > 56 years. This is because of the awareness of use and application of herbal medicines adapted from elders to the children. This informed type of learning and experience is slowly built up and at an older age, a person is able to apply this knowledge to his or her community (Table 1).

The values obtained were interpreted in the ranges $0 \leq H' \leq 1$, with values near zero corresponding to a perfectly homogeneous diversity index and those whose diversity index score is near 1 corresponding to a perfectly heterogeneous or highly diverse community (Table 3). This trend of H = 2.554 and E_H = 0.8836 explains uneven distribution of medicinal plant species (uni-modal) in areas where there is no complete replacement. Today, species of medicinal plants are non-existent in particular areas within the forest, either due to human disturbances attributed to harvesting, cultivation, or habitat destruction.

Conclusion

Results from this study suggest that all the people living in communities around Kalinzu CFR utilize the forest as a source of medicinal plants. However, the use, harvesting and processing of medicinal plant species from the forest is not sustainable. Unsustainability is due to poor harvesting methods such as debarking, stem cutting, or uprooting of plants that could result into drying of part or the whole plant. Also, over-harvesting of plant parts could reduce the potential of the plants' population to regenerate and meet the increasing demands of the people. Eighteen (18) medicinal plant species belonging to 13 families and 16 genera were identified with some plant species used in the treatment of common diseases. Most of the herbal medicines were used in liquid form as concoctions or infusions from plant parts, namely roots, stem, bark, and shoot (leaves, flowers, and seeds). To a small extent, dry and powdered herbal medicines are used externally or chewed when dry. Use of leaves and the bark

could damage the parent plant's tissues and potential to regenerate. Many of the local communities living around Kalinzu forest did not practice methods of conservation of medicinal plants. Those who grew some medicinal plant species in their gardens or homes grow very few species. Lack of conservation projects in these areas could be one of the reasons to account for the low supply of medicinal plants. Also, the belief by the local populations that medicinal plant species are abundant in the forest and that there is no need of growing them in gardens and homes could negatively affect their supply.

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Conflict of Interests
The authors have not declared any conflict of interests. Reference has been thoroughly made in comparison to the Uganda National Herbarium and the World Plant list to verify the existence of the medicinal plant species identified by this study.

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