

Full Length Research Paper

Documentation of indigenous knowledge on medicinal plants used to manage common influenza and related symptoms in Luwero district, central Uganda

Katuura E.^{1*}, Omuja F.², Tumusiime R. H.², Nabukalu D.³ and Byamukama R.⁴

¹Department of Plant Sciences, Microbiology and Biotechnology, School of Biological Sciences, College of Natural Sciences P. O. Box 7062, Makerere University Kampala, Uganda.

²Natural Chemotherapeutics Research Institute, P. O. Box 4864, Ministry of Health, Kampala, Uganda.

³Traditional and Modern Health Practitioners Together Against AIDS (U), LTD, P. O. Box 21175, Kampala, Uganda.

⁴Department of Chemistry, College of Natural Sciences P. O. Box 7062, Makerere University Kampala, Uganda.

Received 8 July, 2016; Accepted 4 October, 2016

Herbs are used in treatment of various diseases in Uganda. Influenza is one of the diseases that is treated by herbs, the disease previously known to be non fatal is progressively becoming a threat due to immune complications in people living with HIV, poor diets and the fear of fatal introduced strains like Bird Flu. An ethno botanical survey was conducted to document medicinal plants and preparations used in the management of influenza and related symptoms in Luwero, Central Uganda. Information was obtained using questionnaires, focus group discussions, key informant interviews, direct observations in households and field excursions. Information on plants/parts used, method of preparation, mode of administration, commonly used formulations and their dosages was documented. Twenty nine medicinal plants distributed in 17 families were documented; *Mangifera indica* family Anacardiaceae, *Ocimum basilicum* L., (Lamiaceae), *Psidium guajava* L. (Myrtaceae) and *Mormodica feotida* L. (Cucurbitaceae) were the commonly used plants respectively. The leaves were the most used part of the plants while decoctions were the commonly used method of preparation and the oral route was the main mode of administration. Antimicrobial assay and nutritional profile of some formulae is underway to standardize formulae that can be used against respiratory infections at household level.

Key words: Medicinal plants, influenza, malaria, indigenous knowledge.

INTRODUCTION

Influenza, commonly known as flu in Uganda, is a contagious respiratory infectious disease which is air borne and is widely spread especially in the hot windy

temperatures (Hudson, 2009; Centre for Disease Control, 2016). For a long time, influenza has been a non-fatal disease in the Tropical African countries. However

*Corresponding author. E-mail: katuurae@gmail.com.

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in the recent past; the disease has caused serious health concerns throughout the world, Tropical Africa being at the highest risk because of its devastating consequences on human and animal health (Qiao-Feng et al., 2012). Consequently, many Sub-Saharan African countries are likely to be at risk of influenza epidemic due to migration of Asian and European nationals for investments in the industrial and other sectors. Most importantly, it is necessary to take precaution and prepare for the influenza epidemic outbreak. As most countries in sub Saharan Africa continue to face challenges of HIV epidemic, patients have compromised immunities which put them at risk of influenza infection. The problem is aggravated by the change of diets from the nutritious half cooked or raw fruits and vegetables, staple boiled or steamed foods to fried and junk diets that have less immune stimulating properties and fewer minerals and vitamins that fight off various diseases including influenza. Although chemotherapy is the mainstay in the management of various diseases including influenza in Uganda, plants remain an important source of medicines especially for the rural poor. The use of plants in the treatment of various diseases has been embedded in many indigenous societies, leading scientists to depend on such plants for drug development. Among the various indigenous medicines used in the treatment of common diseases such as malaria are plants used in treatment of influenza. The use of plants as medicine has been attributed to the presence of bioactive components such as flavanoids, alkaloids, saponins and tannins (Evans, 2002; Farnsworth, 1994). Several studies have confirmed antiviral activities of medicinal plants (Rajbhandari et al., 2001; Gebre-Mariam et al., 2006; Qiao-feng et al., 2012).

Like other sub Saharan African countries, majority of the rural communities in Uganda use medicinal plants in the treatment of diseases including influenza. Considering the rate at which natural vegetation which are source of medicinal plants are being depleted due to increased population pressure on the land and climate change effects, many important medicinal plants are disappearing before they are even documented, leave alone being scientifically validated. Moreover, dyeing off of the old people who are the custodians of indigenous knowledge even worsens the situation. Because of poor conservation of indigenous knowledge, scientists have used ethno pharmacological survey as the main approach to search for important plant species that can be evaluated for development of efficacious drugs (Farnsworth, 1994). Although many of these ethno botanical surveys have been carried out in Uganda to document plants used in treatment of various diseases, no systematic study has particularly been carried out for documenting in depth information on medicinal plants used by communities in treatment of influenza and related ailments. In this study, we obtained indigenous peoples perception of the disease and documented the plants, parts used, mode of preparation and administration of medicinal plants and

practices used by the local communities to treat influenza and related symptoms in Luwero District in Central Uganda. We also documented common formulae as used by the respondents in the surveyed areas.

MATERIALS AND METHODS

Study area

An ethno botanical survey was conducted in Luwero district (Figure 1), central Uganda in the two sub counties of Luwero and Butuntumula. Luwero district was chosen because there are organized Village Health Team (VHTs) members and herbalists at the community centre for traditional medicine, supported by the Ministry of Health. The research team also has established good working relationship with the leaders and some respondents. Luwero District is also one of the districts of Uganda that had experienced the Ebola viral disease outbreak in the recent past (Figure 1). The survey was carried out between May and June, 2012 to document community perception of the influenza and related infections symptoms, forms, causes and plants used for its management by the indigenous communities and related infections. Information was collected using individual interviews with semi structured questionnaires, focus group discussions, key informants and direct observation in the field from consenting adults who included both males and females of 18-60 years of age. A total of 60 households that mainly comprised of a village health team representative who are members of the community selected by Ministry of Health, Uganda to Coordinate Health programme at village level (MoH, 2010) and a few Traditional Health Practitioners (THPs) were interviewed. Information on community perception of manifestation of influenza disease, plants and parts used in the treatment, their preparation and dosage was documented. Family heads/representatives that had at least two children below the age of five were selected using Snowball method (Hardon, 2001) and interviewed. This was because children below five are the most vulnerable to influenza infection (Mbonye, 2004). After the individual survey, focus group discussions (FGD), each consisting of 10 members (both females and males) was conducted at the community centre for traditional medicine located at the district.

The FGD was to document priority plant, methods and formulae used in the treatments of influenza related symptoms. In depth interviews with key informants that included two elderly and five renowned THPs in the area were carried out to obtain in depth knowledge on community perception of influenza manifestation and its management. In addition, Allopathic Health officials at national health facility (Kasana Government Health Center in Luwero District) were also interviewed in order to get in depth knowledge of influenza frequency of occurrence among patients and its management at the health centre. Field excursions were carried out to identify the plants reported by VHTs and THPs and voucher specimen were collected. Voucher specimens were identified by a taxonomist at Makerere University National Herbarium, Kampala and then deposited at the Natural Chemotherapeutic Research Institute, herbarium in, Kampala.

RESULTS

The results of socioeconomic demographic characteristics of the respondents in this study are presented in Table 1. Most of the respondents (88.9%) were aged between 18 years to 55 years and. Majority (70.0%) were female with 87% being married. Approximately 57.0% of respondents

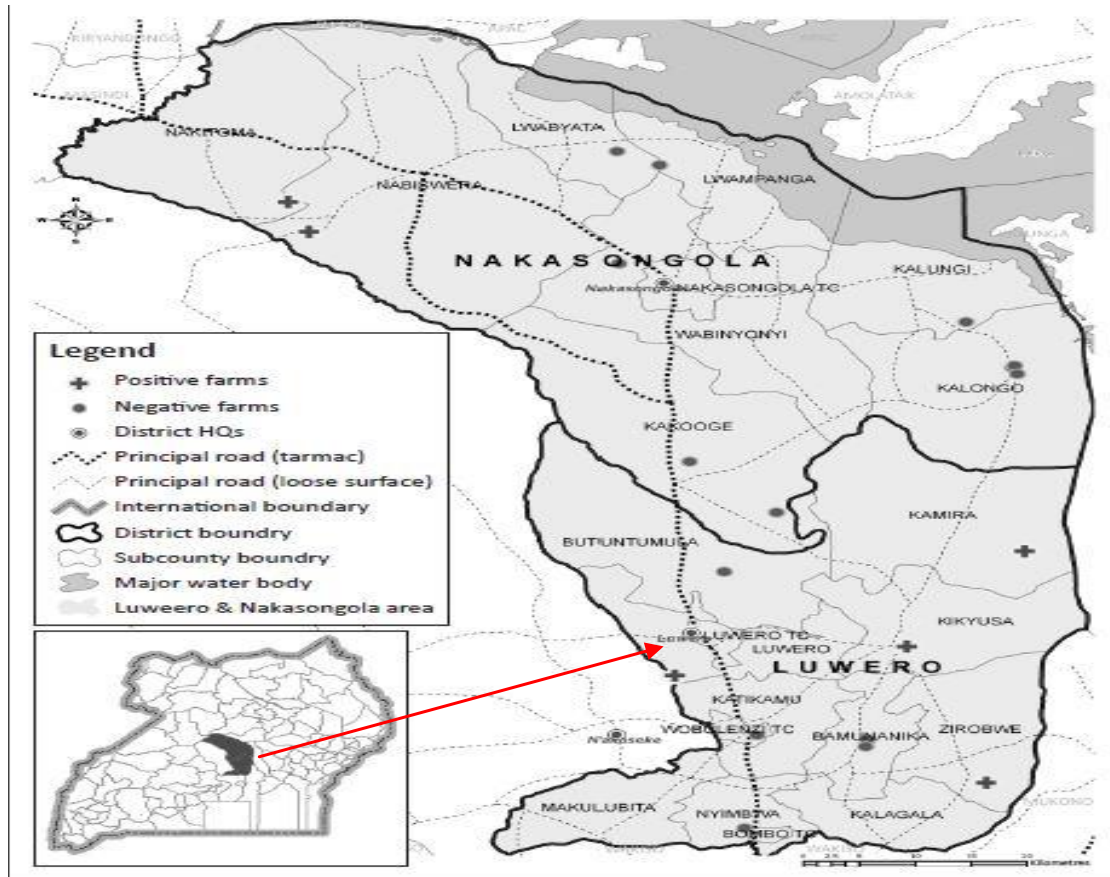


Figure 1. Map showing Luwero district in Uganda.

had family size of between 5-9 members. The education of most respondents indicated majority (56%) having completed primary level of education with most of the respondent (84.7%) being farmers as their main occupation.

Community knowledge of Influenza and its symptoms

The symptoms that were related with influenza by respondents are presented in Table 2. Most respondent (54.3%) identified running nose while sneezing was reported by 52.2% as the symptoms associated with influenza. Other symptoms reported by respondents included headache (39.1%), fever (34.1%), cough (28.3%), itchy throat (28.3%), red eyes (13.0%), change in breathing (10.9%). Other symptoms included blocked nostrils (8.7%), loss of appetite (8.7%), body weakness (6.5%), itchy nose (6.5%), body pain (4.3%), chest pain (4.3%), swollen eyes (4.3%), voice changes (4.3%), tears in eyes (4.3%), itchy ears (4.3%). Also mentioned by respondents were diarrhea, dry mouth, high body temperature, itchy eyes, salivating and the body filling cold (chills).

Nomenclature of influenza in Luwero district

Respondents further categorized influenza disease and gave it names according to the differences observed in its manifestation. The different categories and the proportion of their occurrence are summarized in Figure 2. The common occurrence of the disease (86%) was the mild infection termed “*Senyiga*” (Luganda dialect) and was mainly associated with symptoms such as running nose, mild headache, sneezing and tears in eye, however the respondents said that the patient has no other complications. Patients manifesting with “*Senyiga*” rarely visit the health centre because the condition allows them to do their daily activities. The other common type of manifestation (52.3%) was “*Lubyamira*”, described by respondents to be severe illness that impairs the person from work. The patients manifesting with *Lubyamira* are likely to be bed ridden for a while, and to have productive cough in association. While the third type of manifestation was referred to as “*Yegu*” and this had symptoms like “*Lubyamira*” but mainly affects the elderly. Unlike “*Senyiga*”, the respondents reported similarity in the symptoms of “*Yegu* and “*Lubyamira*” the difference was age of the individual. Lukusense and Seseba were rare

Table 1. Socio-economic demographic characteristics of respondents.

Variable	% respondents
Age	
18-35 years	46.7
36-55 years	42.2
>55years	11.1
Sex	
Female	69.6
Male	30.4
No. of people in house hold	
0-4 members	14.3
5-9members	57.1
10-14members	23.8
>14members	4.8
Marital status	
Single	2.2
Married	87.0
Divorced	4.3
Widowed	6.5
Education	
None	15.6
Primary	55.6
Secondary	28.9
Occupation	
Farming	84.8
Civil service	2.2
Student	2.2
Nursery teaching	2.2
Building	2.2
Business	2.2

manifestations reported by respondents.

Mode of transmission of common influenza

The community knowledge on mode of transmission of common influenza are presented in Table 3. The respondents gave a diversity of the possible causes of influenza. Most respondent (40.0%) identified wind as major cause of influenza while 20% reported that sometimes a person is vulnerable to get infected with influenza due to diseases such as asthma. About 15% reported that a virus is the cause of influenza, but 13.3% said it was taking un-boiled water, smoke (11.1%), lack of body fluids (6.7%), dust, aeroplanes and staying near already sick people, transmission by birds, coldness, and dry seasons were cited by 4.4 and 2.2% of the respondents respectively.

Infection according to age

According to the respondents, infection with influenza is not

Table 2. Knowledge of the respondents, on the symptoms of influenza in Luwero district.

Symptom	% respondents
Running nose	54.3
Sneezing	52.2
Headache	39.1
Fever	34.8
Cough	28.3
Itchy/sour throat	28.3
Red eyes	13.0
Change in breathing pattern	10.9
Blocked nostrils	8.7
Loss of appetite	8.7
Body weakness	6.5
Itchy nose	6.5
Body pain	4.3
Chest pain	4.3
Swollen eyes	4.3
Voice changes	4.3
Tears in the eyes	4.3
Itchy ears	4.3
Diarrhea	2.2
Dry mouth	2.2
High body temperature	2.2
Itch eyes	2.2
Salivating	2.2
Body feeling cold	2.2

N=60.

segregate as presented in Figure 3. Nearly half of the respondents reported that influenza affect all age groups. Although, 44.4% reported that it affects mostly children, 17.8% reported that affects new born babies. Meanwhile 15.6% reported those elderly people were most affected by influenza while 8.9% reported that pregnant women were also commonly infected by influenza.

Frequency of infection with influenza

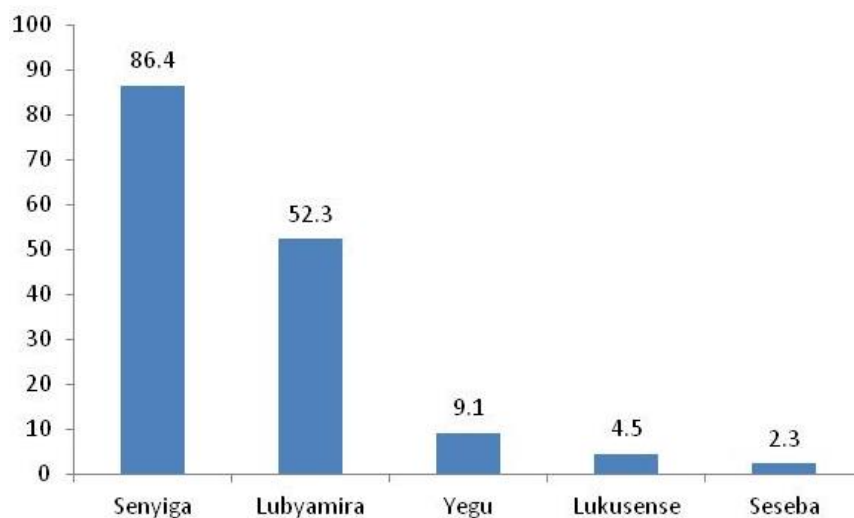
The number of times and individual could be infected by annually was given by respondents as presented in Figure 4. Twenty percent of respondents reported that a person is infected by influenza any time and every 3 month respectively. About 14% and 12% of respondents said it be weekly and monthly, respectively. Eleven percent of the respondents reported that the disease affects an individual in almost every four months. Four percent could not estimate the number of times a person could be infected by influenza annually.

Method used by communities to treat influenza

The respondents reported various methods used to

Table 3. Community and traditional health practitioner's knowledge of possible causes of influenza.

Cause	% respondents
Wind	40.0
Vulnerability due to diseases e.g. asthma	20.0
Virus	15.6
Un boiled water	13.3
Smoke	11.1
Lack of fluids	6.7
Dust	4.4
Germ	4.4
Aero plane fumes	4.4
Being around sick people	2.2
Birds	2.2
Coldness	2.2
Dry seasons	2.2

**Figure 2.** Different local names of influenza in Luwero district.

manage influenza at household in community are presented in Figure 5. Most respondent (45.2%) reported using allopathic while 19% used herbal medicine. About 35.7% reported that they combined both herbal medicine and allopathic medicine.

Medicinal plants used in treatment of influenza

The medicinal plants used for treatment of influenza and related symptom are presented in Table 4. The study revealed 29 medicinal plants distributed in 17 families. *Mangifera indica* (family Anacardiaceae), was the most commonly mentioned (67.4%) medicinal plant, followed by *Ocimum basilicum* (39.5%), *Psidium guajava* (34.9%), *Mormodica feotida* (30.2%), *Callistemon rigidus* (27.9%)

and *Citrus limon* (23.3%) in that order. The family Myrtaceae had the highest number of plants, followed by Rutaceae, Lamiaceae and Asteraceae, respectively.

Information on percent availability, formulation and administration of herbal medicines

The respondents gave information on the availability, formulation and administration of herbal medicine to treat influenza as presented in Table 5.

Habitats of the medicinal plants

The medicinal plants used for treatment of influenza and

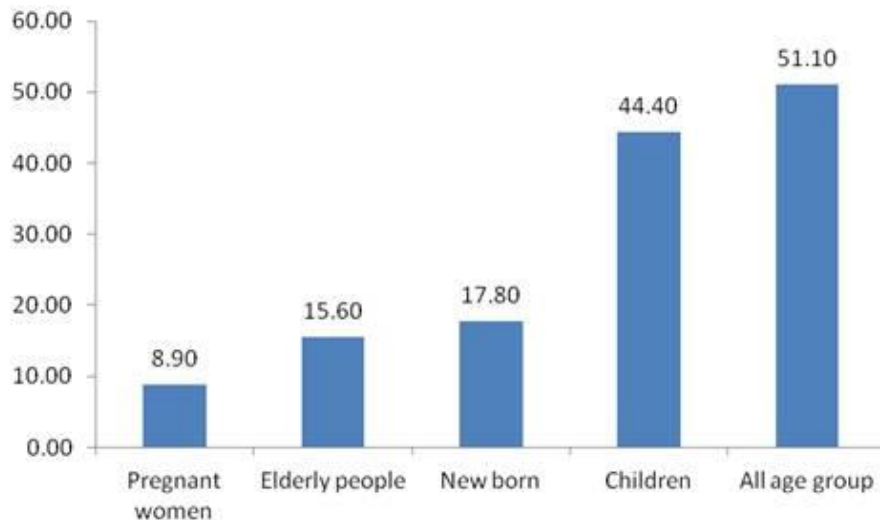


Figure 3. Age group affected by influenza in Luwero district.

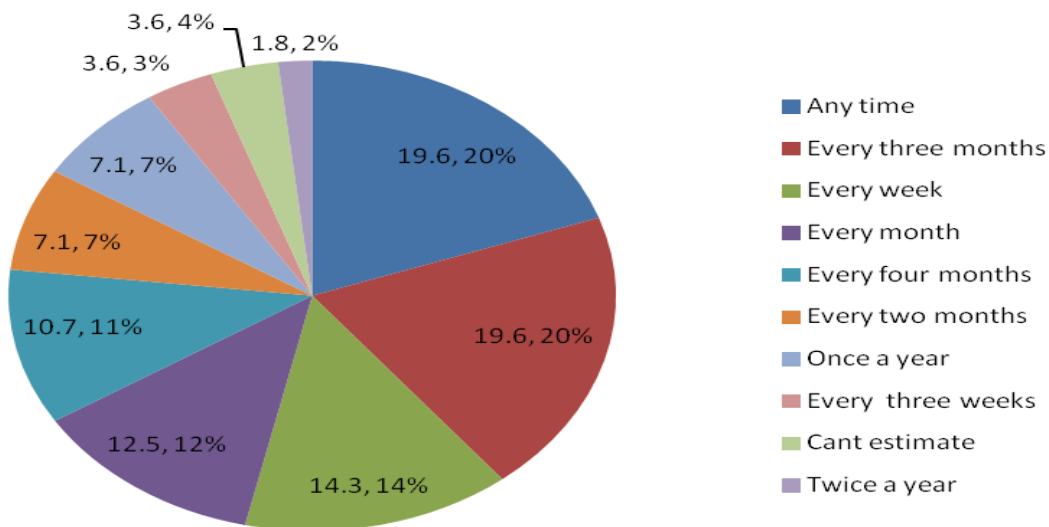


Figure 4. Frequency of infection with influenza.

related symptoms are still accessible to the households. Majority (54%) of the respondents reported to collect them from the wild while about 46% harvest them in backyard gardens. The respondents also said that majority (97%) of the plants are abundant and only about 3% were said to be rare.

Type of herbal formulation

Among the formulations, majority (55%) were reported to be formulated from single plants while 45% formulated from mixtures of plants that range from two to six in the respective formulae. In these formulations, the three most

regularly used plant parts were; leaves (90.2%), followed by the stem bark (63.4%) and fruit (31.7%) in order of preferred use by respondents. Also used were the root bark (22.0%) bulb (7.3%) and whole plant (4.9%), as shown in Figure 6. A part from medicinal plants, other natural products reported to be added in some formulae include; egg yolk, ash, salt, cow ghee, milk, mushrooms, cold sponge and water.

Method of preparation and administration

The most common methods preparation of the herbal medicines reported by respondents included; decoction

Table 4. Frequently used medicinal plants, parts used, method of preparation and mode of administration for the treatment of influenza and related symptoms, in Luwero district.

Scientific name, (Authority) Voucher No., family, local name and route of administration	Method of preparation and part of the plant used	% Frequency of use (N=60)	Scientific studies on the plant against respiratory infections
<i>Magnifera indica</i> L. EKM/80,(Anacardiaceae), Muyembe ^{O, S}	Decoction ^{SB} , Steaming ^{L, RB, SB}	67.4	Antibacterial activities (Bossa et al, 2007) Antimicrobial activity (Dabur et al. 2007)
<i>Ocimum basilicum</i> L. EKM/90 (Lamiaceae),Kakubansiri ^{O, M, S}	Decoction ^L , Steaming ^L , Juice ^L	39.5	Antibacterial activity (Siddiqui et al., 2012) Antibacterial activity (Chah et al., 2006)
<i>Psidium guajava</i> L. EKM/81 (Mytaceae, Mapeera ^O	Decoction ^L , Steaming ^L	34.9	Review of phytochemistry, ethnobotany and pharmacology (Gutierrez et al., 2008)
<i>Mormodica feotida</i> L.EKM/82 (Curcubitaceae), Bombo ^{B, M, O}	Decoction ^{WP} , Juice ^L	30.2	Ethnobotanical (Segawa and Kasenene 2007)
<i>Callistemon rigidu</i> EKM/75 (Mytaceae), Mwambalabutonya ^{O, S} .	Decoction	27.9	Ethnobotanical use against cough (Kakudidi et al, 2000)
<i>Citrus limon</i> L. EKM/69 (Rutaceae), Niimu/endimu ^O	Decoction ^{F, L} , Chewing ^F , Steaming ^{L, F} , Juice ^F	23.3	Ethnobotany, (Camejo-Rodrigues et al.,2003)
<i>Syzygium cuminii</i> (L) Skeels EKM/84 (Myrtaceae) Jambula ^O	Decoction ^{L, SB}	20.9	Antioxidative properties(Glover et al.,1961; Kokwaro 1976)
<i>Vernonia amygdalina</i> L. EKM/95 (Asteraceae), Mululuza ^{O, S}	Decoction ^{L, RB, SB} Juice ^L	16.3	Antiplasmodial and cytotoxic activity (Lacroixa et al., 2011) Antibacterial (Erasto et al.,2006)
<i>Digitaria scaralum</i> (A. Rich.) Stapf EKM/96 (Poaceae) Olumbugu ^{O, S}	Decoction ^{RB, WP} , Infusion ^{RB, WP}	16.3	
<i>Combretum molle</i> R. Br.ex G.Don f. EKM/97 (Combretaceae) Endagi ^O	Decoction ^{SB} , Steaming ^{SB}	14.0	Biological activity (McGaw et al.,2001; Eloff et al., 2008)
<i>Citrus aurantiifolia</i> (Christm) EKM/91 (Rutaceae) Enimawa ^O	Decoction ^{F, L} Chewing ^F , Juice ^F	14.0	Used to treat cough and influenza (Kokwaro 1976; Adjanohoun et al 1993; Tabuti at al; 2003b)
<i>Azadirachta indica</i> _ A. Juss EKM/ 87 (Meliaceae), Neem tree ^O	Decoction, ^{L, SB} Steaming ^{L, SB} , Juice ^L	14.0	Antiviral (Faccin-Galhardi et al.,2012) , Toxicity (Mbaya et al., 2010)
<i>Persea americana</i> Miller EKM/85 (Lauraceae), Avocado ^{O, S}	Decoction ^{L, SB} , Steaming ^{L, SB}	14.0	
<i>Eucalyptus</i> sp. L'Herit. EKM/99 (Myrtaceae), Kalitunsi ^{O, M, S}	Decoction ^{L, SB}	14.0	Used to treat cough and fever (Adjanohoun, 1993)
<i>Manihot esculenta</i> Crantz EKM/76 (Euphorbia) Muwogo ^{B, M, O, S}	Decoction ^L	9.3	
<i>Hoslundia opposita</i> Vahl EKM/75 (Lamiaceae), Kamunye	Decoction ^{L, A}	9.3	Used to treat colds (Bally 1937; Kokwaro 1976)
<i>Erigeron floribundus</i> Sch. Bip.EKM/28 (Asteraceae), Kafumbe ^{O, S}	Decoction ^{L, A}	7.0	
<i>Acacia polyacantha</i> EKM/27(Fabaceae), Kibeere ^O	Decoction ^{SB}	7.0	
<i>Piliostigma thonningii</i> EKM/ 100 (Caesalpinaceae) Omugaali ^O	Decoction ^{L, SB} , Steaming ^{L, SB}	7.0	
<i>Leonotis nepetifolia</i> (L) R. Br. EKM/30 (Lamiaceae), Ekifumufumu ^{O, S}	Decoction ^{L, A}	4.7	
<i>Morus alba</i> L. EKM/31 (Moraceae), Enkenene ^O	Decoction ^L	4.7	Antimicrobial ant-oxidative activity (Wang et al, 2012)
<i>Artocarpus heterophyllus</i> Lam. EKM/56 (Moraceae), Fene ^O	Chewing ^F , Decoction ^{L, SB}	4.7	
<i>Lantana camara</i> L.EKM/54 (Verbanaceae), Kayukiyuki ^O	Decoction ^L , Steaming ^L	4.7	Antimicrobial activity (Dabur et al., 2007)
<i>Maytenus senegalensis</i> (EKM/27) Celastraceae), Naligwalimu ^O	Decoction ^{RB, SB}	4.7	
<i>Ageratum conyzoides</i> L. (EKM/32) (Asteraceae),Namirembe ^{O, S}	Decoction ^{L, A}	4.7	Used to cure cough(Kokwaro 1976;Geissler et al.2002)
<i>Albizia coriaria</i> Welw. ex Oliver EKM/20 (Fabaceae), Omugavu ^{B, O}	Decoction ^{SB}	4.7	Anti-parasitic activity and cytotoxicity (Kigondu et al., 2009)
<i>Lycopersicon esculentum</i> Miller EKM/22 (Solanaceae) Nyanya ^O	Chewing ^F	4.7	
<i>Citrus sinensis</i> (L.) Osbeck EKM/30 (Rutaceae), Micwunga ^O	Decoction ^{F, L} , Steaming ^{F, L}	4.7	Ethnobotany, (Camejo-Rodrigues et al.,2003)

Key: Part of plant used: SB, Stem bark; L, Leaves; RB, Root bark; F, Fruit; WP, Whole plant; A, Aerial part;

Method of preparation: Decoction, boiling of the dry plant for some minutes and leaving to cool; Steam Bathing, Boiling of the herbs in water and covering to inhale steam; Juice is squeezing a liquid from the plant part; Infusion, bringing to boil; Chewing, eating of the plant part raw. **Route of administration:** ^O Oral; ^B Bathing; ^S steaming; ^M massaging.

(62%), juice from leaves and fruits (17%) and steaming (13%). The routes of administration of the medicines reported by respondents were; oral, inhalation, steam baths and massage at 58, 19, 13 and 10% respectively.

Some formulae used in the treatment of influenza and related symptoms in Luwero district

The study documented sixty formulae, of these six formulae that were given through the oral route of administration, with detailed information that was compiled in the focus group discussions are given as follows;

(1) Formula

Ingredients (plants)

Scientific name	Local name	Part used	Quantity
<i>Maytenus senegalensis</i>	Naligwalimu	Leaves	Handful
<i>Wabugia ugandensis</i>	Abaasi	Bark	Handful
<i>Eucalyptus sp.</i>	Kalitunsi	Leaves	Handful
<i>Callistemon rigidus</i>	Mwambalabutonya	Leaves	Handful

Preparation

- (i) Mix the four plants and pound them together.
- (ii) Pick two handfuls of the mixture, using one hand.
- (iii) Add six cups of water (3 L) in the saucepan

(iv) Boil until water remains to three cups (1.5 L).

Dosage: Two spoons (10 mls) three times a day (i.e. morning, afternoon, evening.)

(2) Formula

Ingredients/plants

Scientific name	Local name	Part used	Quantity
<i>Chenopodium opunifolium</i>	Omwetango	Bark	4 pieces
<i>Magnifera indica</i>	Omuyembe	Bark	4 pieces
<i>Canarium schweinfurthii</i>	Omuwafu	Bark	2 pieces
<i>Acacia polyacantha</i>	Kibeere	Bark	2 pieces
<i>Eucalyptus sp.</i>	Kalitunsi	Bark	1 pieces
<i>Syzygium cuminii</i>	Jjambula	Bark	3 pieces

Preparation: Boil the mixture in five liters of water until it remains with two liters.

Dosage: *Adults:* Take two spoons (10 ml) x three daily
Children: take one spoon (5 ml) x three daily

(3) Formula

Ingredients/plants

Scientific name	Local name	Part used	Quantity
<i>Tagetes minuta</i>	Kawunyira	Leaves	8 leaves
<i>Mormodica feotida</i>	Bombo	Leaves	4 leaves
<i>Ocimum basilicum</i>	Kakubansiri	Leaves	4 leaves
<i>Carica papaya</i>	Pawpaw	Leaves	2 leaves
<i>Citrus limon</i>	Lemon	Fruit	1 fruit
<i>Callistemon rigidus</i>	Mwambalabutonya	Leaves	3 handfuls

Preparation: Add four cups (500 ml) of water and boil until it remain two cups

Dosage: *Adults:* 2 spoons (10 ml) x three times
Children: One spoon (2.5 ml) x 3 times
Note : Take Namirembe plant for stomach pains

(4) Formula

Ingredients/plants

Scientific name	Local name	Part used	Quantity
<i>Mormodica feotida</i>	Ebombo	Leaves	8 leaves

Preparation: Crush 8 leaves in ½ L (500 ml) of water **Dosage:** Take all 500 ml in one day

(5) Formula

Ingredients/plants

Scientific name	Local name	Part used	Quantity
<i>Vernonia amygdalina</i>	Mululuuza	Root bark	Handful
<i>Magnifera indica</i>	Mango	Leaves/bark	Handful
<i>Psidium guajava</i>	Mapeera	Leaves	Handful
<i>Piliostigma thonningi</i>	Omugaari	Leaves	Handful
<i>Combretum molle</i>	Endagi	Leaves	Handful

Preparation: Boil one handful of each in five liters of water until you remain with three liters.

Dosage: Adult ½ a tumpeco (250 ml) 3 times a day. Note: A difference in 3 days, 7 days for complete healing.

Dosage: Drink one cup 2 times (one litre) a day, morning and evening.

(6) Formula

Ingredients/plants

Scientific name	Local name	Part used	Quantity
<i>Rhus vulgaris</i>	Obukwansokwanso	Fruit	Four fruits

Preparation: Eat the fruit

Dosage: Four fruit x 3 daily

Table 5. Presents percent availability, formulation and administration of herbal medicines used by the respondents of Luwero

Habitat of plants	% response
Wild	54
Gardens	46
Formulation of herbal medicine	
Single plants	55
Mixtures	45
Method of Preparation of medicinal plants	
Decoctions	62
Juice	17
Steaming	13
Chewing	5
Infusion	3
Mode of administration	
Oral	58
Inhalation	19
Bathing	13
Massaging	10

DISCUSSION

Clinically, influenza disease in human is associated with symptoms such as; cough, malaise and fever and this is normally accompanied with sore throat, nasal obstruction and sputum production (Hudson, 2009). Nevertheless, in severe cases it causes bronchitis, pneumonia, asthma and chronic obstructive pulmonary disease (Morens et al, 2007). Children under five years and elderly are more vulnerable, because of their immunity is low (Bearden et al., 2012; Yu et al., 2013). Until the recent past in most tropical African countries, influenza as a disease has been considered a mild infection that clears without any/strong medication. In view of this, community knowledge perception of the influenza epidemic is important since community knowledge of influenza symptoms and its management can be used to develop strategies for its control. The fact that common influenza virus causes low immunity among patients could also lead to the patients getting secondary infections, particularly in manifestation described as “*Lubyamira* and *Yegu*” by the respondents in this study. While knowledge of influenza manifestation is important, understanding its management particularly in the rural settings is important too. For centuries, knowledge of medicinal plants in management of diseases has been a key to almost every community. In sub Saharan African countries like Uganda, herbal medicine is used by majority due to the poor infrastructure of the national health care system which

leads to inaccessibility of allopathic drugs and also high cost for the available conventional health care. Herbs have also been proven efficacious against influenza and other viruses (Xiuying, et al., 2012; Mousa, 2015) and communities have strong belief in herbal medicine with high level of acceptability due to the perception that they

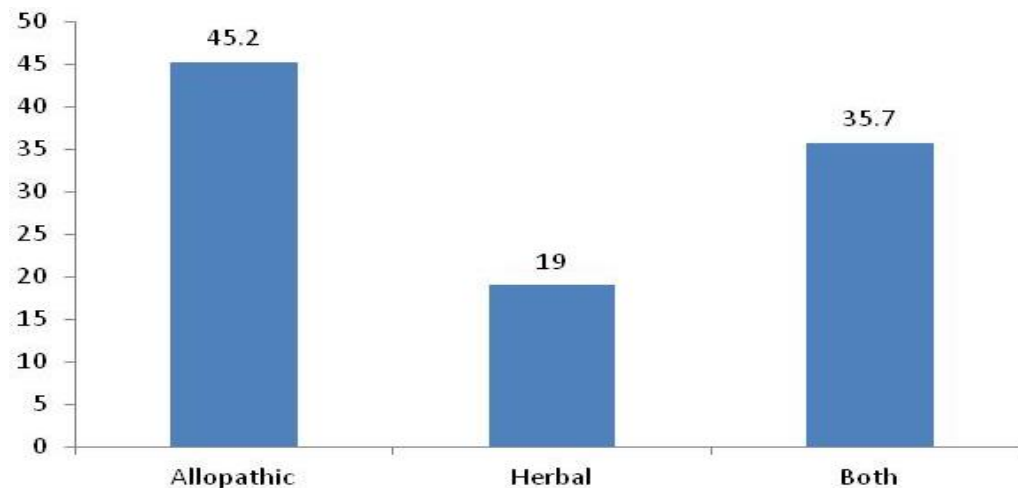


Figure 5. Method used by communities to treat influenza.

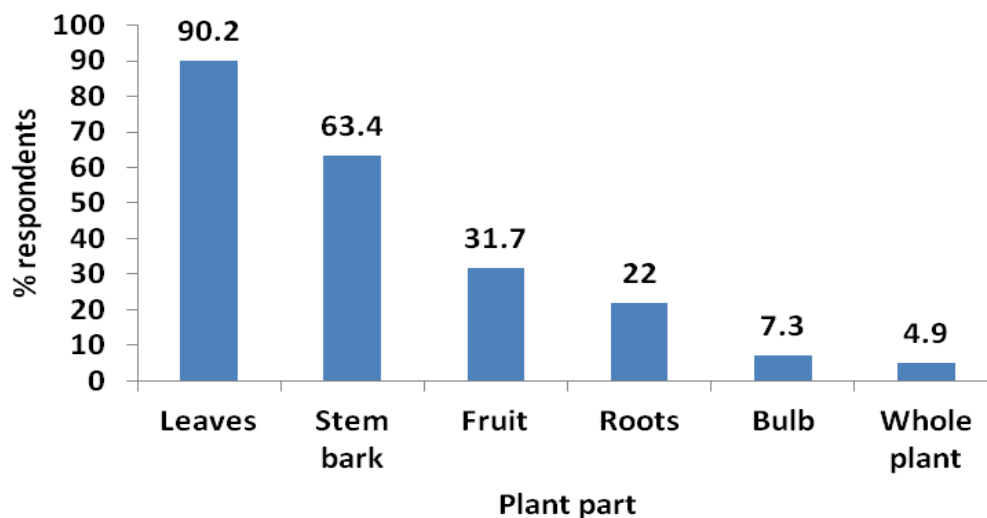


Figure 6. Parts of medicinal plant used for treatment of influenza and related symptoms.

are efficacious and safe makes its use widely acceptable (WHO, 2003). The plants reported in this study have been reported in previous ethno botanical surveys, and a few of them have also been proven scientifically to possess immune boosting properties, antibacterial, anti-inflammatory, antiviral activities, vitamins and minerals. For example, *Citrus* fruits and *Psidium guajava* have bioactive compounds, vitamin C, and micro minerals that are good immune boosters (Gutierrez et al., 2008).

In addition other ethno botanical studies have indicated plants in families Myrtaceae, Rutaceae, Lamiaceae and Anacardiaceae to have been used in traditional medicine and to possess therapeutic properties (Koudouro et al., 2011). According to Menkovic et al., (2011), *Nepeta cataria* (Lamiaceae) is ethno botanically reported to treat

cold and fevers associated with influenza. On the other hand there has been observed strong co-movements between influenza and Malaria in some tropical countries which suggest that humidity which is an important factor in transmitting malaria also plays a role in influenza transition (Vaisenberg and Noymer, 2011). This is coupled with the fact that Influenza has symptoms related to those of malaria. In fact the symptoms are not that dramatic and can easily be mistaken for an attack of influenza (Netcare, 2014). In the rural areas of Uganda, most people in the local communities take medicines including herbal medicines without diagnosis. It is possible that some of the cases that were reported to be influenza could be malaria cases. It is therefore probable that these herbal formulae used for treatment of influenza

also have antimalarial activity. The team will in future validate antimalarial activities of these formulae to ascertain their efficaciousness. Unlike Allopathic medicine which has clear guidelines and is standardized the world over. Herbal medicine especially in most African countries including Uganda is not standardized at almost all stages of development and use. Majority of the measures documented in this study such as handful, pieces, leaves are not uniform and this brings about a major discrepancy in formulation and dosage. It is intended that these formulae will be standardized as well as be evaluated for their effectiveness if in addition to their safety and efficacy in treatment of influenza and related infections.

Conclusion

This study conducted in Luwero district in Central Uganda, identified and documented 29 medicinal plants and about six formulae used for treatment of influenza and related symptoms by the respondents. The Indigenous knowledge has been organized to support conventional measures in the management of influenza and related symptoms and the evaluation of the efficacy of priority medicinal plants/ herbal formula *in vivo* is ongoing. All together, the information obtained in the study will be used in the standardization of herbal medicine that can be recommended for used against respiratory infections at household level in Luwero. Phytochemical investigations are recommended to determine the active compounds in the plants. While clinical trials to determine the efficacy of the plant formula in human are suggested. There is high chance that an active molecule with antiviral or antibacterial inhibiting properties can be identified and used as a template in developing a cheaper and affective medicine that can be used in the management of influenza and related illnesses. Tested and efficacious formula in clinical trials can also be integrated in the national health care system for treatment of influenza and other bacterial infections at household level, particularly in the rural areas where access to allopathic medicine is still a challenge.

Conflict of Interests

The authors have not declared any conflict of interests.

ACKNOWLEDGEMENTS

Authors acknowledge the communities of Luwero district for providing us for the information. We are grateful to Avian Human Influenza Project at Ministry of Health, Uganda for funding this research. We are also thankful to the European Union project on Multi-disciplinary University Traditional Health Initiative (MUTHI), for

training in medical anthropological studies research capacity.

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