

## ORIGINAL RESEARCH ARTICLE

# Medicinal Plants used during Antenatal Care by Pregnant Women in Eastern Uganda

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## Abstract

Plants are commonly used during the antenatal stage in pregnancy to manage different ailments in Africa. In Uganda, both medicinal and food plants are used to handle common pregnancy related conditions. An ethnobotanical survey was conducted in Iganga district, eastern Uganda. Seven traditional birth attendants (TBA) and 46 mothers were interviewed. Data was collected using structured questionnaires and household interviews. The TBAs were identified using snowball sampling. A total of 33 plant species, belonging to 23 families were documented. Out of these, the pregnant mothers used 45.5 % as both food and medicine. The most frequently used plant life form was herbs (58.8%). The leaves are the most commonly used plant parts (59%). Most of the plants (58.8%) were semi cultivated and were being domesticated in crop fields and home gardens. Most of the plants were used to manage anaemia and for child development and good health among the pregnant women. The pregnant women and TBAs in Namungalwe sub County have diverse knowledge on medicinal and nutri-medicinal plants in the management of common pregnancy related diseases, which can be used to supplement modern antenatal services, inspite of the ban of the activities of TBA. Further research on the bioavailability of nutrients, efficacy and safety of the medicinal plants used by pregnant women should be done. (*Afr J Reprod Health 2017; 21[4]: 33-44*).

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**Keywords:** Medicinal Plants, Antenatal, Traditional Birth Attendants, Uganda

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## Résumé

Les plantes sont couramment utilisées pendant le stade prénatal pendant la grossesse pour gérer les différentes maladies en Afrique. En Ouganda, les plantes médicinales et alimentaires sont utilisées pour traiter des conditions courantes liées à la grossesse et pour compléter les services de soins prénatals modernes. Une enquête ethnobotanique a été menée dans le district d'Iganga, dans l'est de l'Ouganda. Sept accoucheuses traditionnelles (AT) et 46 mères ont été interviewées. Les données ont été recueillies à l'aide des questionnaires structurés et d'entrevues auprès des ménages. Les AT ont été identifiées en utilisant un échantillonnage en boule de neige. Un total de 33 espèces végétales appartenant à 23 familles ont été documentées. Parmi celles-ci, les femmes enceintes consommaient 45,5% de nourriture et des médicaments. La forme de vie végétale la plus fréquemment utilisée était les herbes (58,8%). Les feuilles sont les parties de plantes les plus utilisées (59%). La plupart des plantes (58,8%) étaient semi-cultivées et étaient domestiquées dans les champs cultivés et dans les jardins potagers. La plupart des plantes étaient utilisées pour gérer l'anémie et pour le développement de l'enfant et une bonne santé chez les femmes enceintes. Les femmes enceintes et les accoucheuses traditionnelles dans le sous-comté de Namungalwe avaient des connaissances diverses sur les plantes médicinales et nutri-médicinales dans la prise en charge des maladies courantes liées à la grossesse, qui peuvent être utilisées pour compléter les services prénatals modernes. (*Afr J Reprod Health 2017; 21[4]: 33-44*).

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**Mots-clés:** Plantes Médicinales, Prénatale, Accoucheuses Traditionnelles, Ouganda

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## Introduction

There is one doctor for every 20,000 people in Uganda<sup>1</sup> and 1.3 midwives and nurses per 1,000 people<sup>2</sup>, compared to 200-400 traditional medical practitioners (TMP) for each person<sup>1</sup>. In contrast,

the world health organisation recommends a minimum of 23 doctors, nurses and midwives per 10 000 population<sup>3</sup>.

In addition, Uganda has a high a maternal mortality rate of 343 per 100,000 live births<sup>4</sup>. In

developing countries, up to 80% of the population use traditional medicine to meet their health care needs<sup>5</sup>. In the rural areas of Uganda close to 90% of the population have been reported to rely on traditional medicine to meet their day-to-day healthcare needs<sup>6</sup>. Women and children constitute the bulk of the people reliant on herbal medicine<sup>7,8</sup>. The broad use of traditional medicine is often attributed to its accessibility and affordability<sup>9,10</sup>.

Traditional birth attendants (TBAs) are important community resource persons who are routinely consulted by pregnant women throughout the course of gestation<sup>10</sup>. Although TBAs mainly operate in the rural areas in developing countries<sup>10</sup>, they also operate in urban areas, and can be an important resource in childbirth care especially among the poor<sup>11</sup>. They assist many women in developing countries to deliver<sup>12</sup>, although no statistics are currently available on their numbers. In Kenya for example, each female TBA attends to more than two hundred pregnant women during the course of their practice<sup>10</sup>.

A large proportion of children in low and middle-income countries are born outside of conventional health facilities, mainly by unskilled community-based birth attendants<sup>13</sup>. However, the issue of TBA has generated a lot of debate and controversy. In some countries, their services have been banned, as is the case in Uganda<sup>14</sup> and Malawi<sup>15</sup>. Despite the ban on TBAs in Uganda by the Ministry of Health in 2010, 80% of women in rural areas are still reported to have preference for their services<sup>6,14</sup>. Between 58%-80% of pregnant women in western Uganda deliver outside a health facility with the assistance of TBAs<sup>6,16</sup>.

The TBAs use plant medicines to assist pregnant women to manage diseases<sup>10</sup> such as dizziness, nausea and vomiting among others<sup>10,8</sup>. Medicinal plants play a significant role during pregnancy, birth and postpartum care in many rural areas of the world<sup>8,11,17</sup>. The use of plants to ensure good development of pregnancy and facilitate labour is a well-established practice in Africa<sup>18</sup>.

Although most natural nutritional supplements used during pregnancy have been

replaced with synthetic western drugs, many pregnant women still look to natural herbs to provide essential nutrition and to aid in the relief of some common ailments<sup>19,20</sup>. The purpose of this study was to document the medicinal plants and practices of TBAs and pregnant women in eastern Uganda in Namungalwe sub County.

## Methods

### *Study area*

This study was carried out in the villages of Mwendanfuko, Bulanga and Nabikoote in Namungalwe sub County, Kigulu County, Iganga district. Iganga district is located in south-eastern Uganda between longitudes 33° 10' East and 34° 00' East and latitudes 0°06' North and 1°12' North and covers an area of 1,039 km<sup>2</sup><sup>21</sup>.

### *The socio-economic status and health care systems*

Most people in Namungalwe belong to the Basoga tribe and are farmers<sup>22</sup>. Health care is provided by both orthodox and traditional health care delivery systems. The orthodox health care delivery system is inadequate<sup>22</sup> with a doctor to population ratio of 1:41,338 in Iganga district where Namungalwe sub County lies. There is also limited basic equipment in the 16-bed capacity Health Centre III in Namungalwe, serving a population of over 3500 people<sup>23</sup>.

### *Ethical Considerations*

Prior to any contact with the local community, the study was introduced to the local area authorities through the district administrators. Written prior informed consent was sought from the respondents before interviewing them. Ethical approval for the study was obtained from Makerere University.

Respondents from sixty different households were selected using a systematic random sampling design in three different villages. The first household was selected randomly using the lottery method described in Tefera *et al.*<sup>24</sup>, and thereafter every third household along a road or

trail was selected. Data was collected from mothers and TBAs in different households using questionnaires. The respondents were asked what common ailments afflicted pregnant women, what medicinal and nutritional plants they used to manage these ailments, which parts they used and how they were prepared. TBAs were selected using the snowball sampling method<sup>25</sup>

Voucher specimens of plants species mentioned were collected and deposited at the Makerere University herbarium using standard plant collection procedures described in Martin<sup>26</sup>. The scientific names and authorities of the plants were verified using the Kew database at <http://www.theplantlist.org> on 1<sup>st</sup> May 2017.

## Results

Fifty-seven respondents aged between 15-50 years were interviewed. Most of the respondents (92%) were Basoga farmers with low education level. Seven of the respondents were TBAs. Thirty-three plant species from 23 families and 33 genera used in disease management were recorded (Table 1). However, one plant species was not unidentified. Fourteen (45.5%) of these plants are used for both nutritional and medicinal purposes. Most species belong to the Malvaceae (4), Anacardiaceae (3), and Asteraceae (3) families. The majority of species used by the pregnant women are semi cultivated (47.1%). These are followed by those cultivated (32.4%) and the least used are wild 20.6%. The respondents had domesticated many plants like *Sida cunefolia*, *Kigelia africana*, and *Vernonia amygdalina*.

### Method of preparation

The commonest method of preparation of the medicinal plants is boiling in water as a decoction and preparation as accompaniment of staple or sauce. Here, the fresh plant part is picked, washed, and cooked in ground nut/sesame (simsim) paste as vegetable sauce. This is a special preparation only for the pregnant women. Some plant medicines are prepared by steaming such as the

*Micrococca mercurialis*. The plant leaves are wrapped in a banana leaf, then wrapped along with other staple foods in additional banana leaves and cooked. Fruits of some plant species are eaten as a snack such as *M. indica*. Some plant parts particularly the leaves or whole plants are prepared as an accompaniment of a staple food or as vegetable sauce like *A. dubius* and *Basella alba*. For plant medicines that are prepared as herbal teas, a powder of a dried plant part is added to tea and milk like powder from the bark of *Steganotaenia araliacea* (Table 1).

### Key plants used by pregnant women in Eastern Uganda

The most commonly mentioned plant species were *Vernonia amygdalina* (39%) followed by *Amaranthus dubius* (6%), *Hibiscus sabdarifa* (4%), *Dicliptera laxata* (4%) and *Persea americana* (4%). Fourteen plants are used to treat more than one ailment; eight of these plants are used to manage more than two conditions. Only two plants *Mangifera indica* and *Corchorus olitarius* are used to handle more than three ailments (Table 1).

Seventeen plant species are used in disease management as food and medicine, out of these 15 have the same part used as food and medicine. The other two plants *Garcinia buchanaii* and *Rhus vulgaris* have different parts used as food and medicine.

### Common ailment categories managed by plant species among pregnant women

Fourteen (23.3%) of medicinal plants were reported to manage lethargy among the pregnant women and thirteen (21.7%) of plants are used to manage anaemia, followed by seven (11.7%) plants used to manage appetite loss and five plants used to boost the body's immunity (Figure 3). All the three ailments viz. lethargy, anaemia and appetite loss managed with most of plants are classified as nutritional disorders by Cook<sup>24</sup>. Most plants are used to manage more than one disease.

**Table 1:** Medicinal Plants Used in the Management of Diseases among Pregnant Women in Eastern Uganda

Family Name	Scientific Name, Local Name (Lusoga), Voucher Number	LF	CS	Conditions treated	FM	PU	Method of Preparation and Administration
Acanthaceae	1. <i>Dicliptera laxata</i> C. B. Cl., Fuula (NPK023)	H	C	Immunity boosting, Lethargy, Anaemia	4	L <sub>d</sub>	Half tsp boiled, cooled and drunk
Amaranthaceae	2. * <i>Amaranthus lividus</i> L. subsp. <i>lividus</i> , Bugga (NPK102)	H	C	Lethargy	1	L <sub>f</sub>	Cooked as vegetable in ground nut paste or steamed with staple food and eaten
	3. * <i>Amaranthus dubius</i> L. Doodo (NPK022)	H	C	Anaemia, Lethargy, Appetite loss or inappetence	6	L <sub>f</sub>	Cooked as a vegetable in ground nut paste or steamed with staple food and eaten
Anacardiaceae	4. <i>Rhus vulgaris</i> Meikle, Akakonso (NPK106)	S	W	Anaemia	1	Rt	Half a tsp of dried powder added to 500ml of tea or fresh roots boiled for one hour and taken thrice daily
	5. * <i>Anacardium occidentale</i> L., Empelele (Ebido) (NC)	H	C	Lethargy	1	Se	Seeds pounded and prepared as a vegetable sauce
	6. * <i>Mangifera indica</i> L., Omuyembe (NPK071)	T	C/W	Immune boosting, Diarrhoea, Cataract, Lethargy	2	B, L <sub>f</sub> , Fr	Bark boiled for one hour Boiled & drunk Eaten as snack
Asclepiadaceae	7. <i>Mondia whitei</i> (hook. F.) Skeels, Mulondo (NPK098)	Cl	W	Syphilis	1	Rt	Dried and roasted root powder added to tea and taken 2-3 times daily
Asteraceae	8. <i>Senecio discifolius</i> Oliv., Katya musuulo, (Mukasa) (NPK015)	H	C/W	Vomiting, Anaemia	1	W	Whole plant squeezed in water. One tsp taken thrice daily
	9. <i>Vernonia amygdalina</i> Del. , Akabilizi akatono (NPK109)	S	W	Blocked fallopian tubes Malaria, Anaemia	1 39	Rt L <sub>f</sub>	Bark/leaves boiled for one hour. Drink half a mug twice daily Boiled in water. Half a mug taken 2-3 times daily
Asteraceae	10. <i>Bidens pilosa</i> L. Obukaala, (NPK030)	H	C/W	Anaemia	2	Fr	Tsp of dried fruits boiled and taken as tea
Basellaceae	11. * <i>Basella alba</i> L., Ndelema (NPK088)	H	W	Lethargy	1	L <sub>f</sub>	Cooked as a vegetable in ground nut paste
Bignoniaceae	12. <i>Kigelia africana</i> (Lam.) Benth., Omufungedha / mwisa/ Naibele (NPK028)	T	C/W	Syphilis, Lethargy, Easy labour	2	L	Half Tsp. boiled and taken as tea

	13.	<i>Markhamia lutea</i> K. Schum., T W	Blocked fallopian tubes	1	Fl	Boiled and taken as tea
		Omusambya (NPK088)				
Brassicaceae	14.	* <i>Brassica oleracea</i> L., Capitata H C	Lethargy	4	L <sub>f</sub>	Prepared as a vegetable in ground nut paste
		Emboga (NC)				
Caesalpinioideae	15.	<i>Cassia didymbotrya</i> Fresen., S C	Inappetence, Yellow fever	2	Rt	Boiled for one hour. Half a mug drunk thrice daily
		Muvuvumila (NPK011)				
	16.	<i>Tylosema fassoglensis</i> (Schweinf.) Cl W	Anaemia	2	Rt	Powder added to cup of tea and taken thrice daily
		Torre and Hillc., Kiyugeyuge (NPK034)	Child repositioning	1	L <sub>f</sub>	Prepared in ground nut paste and eaten as sauce
Cannabaceae	17.	<i>Cannabis sativa</i> L., Endaye H C	Measles	1	L <sub>f</sub>	Boiled for one hour.
Capparidaceae	18.	* <i>Cleome gynandra</i> L., Eiyobybo H C	Lethargy	1	L <sub>f</sub>	Prepared as a vegetable in ground nut paste and eaten as sauce
		(NPK083)				
Clusiaceae	19.	<i>Garcinia buchananii</i> Bak., Musaali S C/W	Vomiting, inappetence, Dizziness	1	B	Dried bark powder is added to a cup of tea or boiled in milk taken 3 times a day
		(NPK069)				
Euphorbiaceae	20.	* <i>Micrococca mercurialis</i> (L) Benth., H W	Immune boosting	1	L <sub>f</sub>	Steamed with staple food or squeezed in water and taken daily
		Kalyabakyala (NPK101)				
Fabiaeae	21.	<i>Sesbania pachycarpa</i> DC, Lutinda S C/W	Stomach pain	1	L <sub>d</sub>	Added to a cup of tea or fresh leaves are squeezed in water, and taken as tea
		kyalo (NPK103)				
Lauraceae	22.	* <i>Persea americana</i> Mill., Fakedo T C	Anaemia	4	B/L	Boiled for one hour. Half a mug is drunk 2-3 times a day
		(NPK037)				
Malvaceae	23.	* <i>Abelmoschus esculentus</i> (L.) Moench., H C/W	Immune boosting, Anaemia	1	L <sub>f</sub>	Cooked as vegetable in groundnut or Sesame paste or steamed and eaten/ prepared as a herbal bath
		Bamia (NPK090)				
	24.	<i>Sida cunefolia</i> Robx., Katunga Ngabo H C/W	Constipation	1	L <sub>f</sub>	Prepared as a vegetable in ground nut paste
		(Kyeyo) (NPK050)				
	25.	<i>Hibiscus sabdariffa</i> L., Kimuli H C	Anaemia	4	L <sub>f</sub>	Prepared as a vegetable in groundnut or dried leaf powder is added to a cup of tea or boiled in milk
		ekimwifu (NPK008)				
	26.	* <i>Manihot esculenta</i> crantz, Mwogo S C/W	Lethargy	1	L <sub>f</sub>	Prepared as a herbal bath and a bath is had twice daily
		(NPK020)				
Moraceae	27.	* <i>Morus alba</i> L. Busokomoli, S C/W	Anaemia, lethargy, Inappetence	1	Fr	Eaten as snack
		(Nkenene) (NPK048)				
Portulacaceae	28.	<i>Talinum portulacifolium</i> (Forsk.) H C/W	Lethargy, Easy labour	2	L <sub>f</sub>	Herbal bath
		Schweinf, Empoza (NPK014)				

Sapindaceae	29. <i>Cardiospermum grandiflorum</i> Sw., Kambula (NPK062)	H	C/W	Cataract	2	L <sub>f</sub>	Steamed in bananas and eaten as food	
				Immune boosting	1	L <sub>f</sub>	Herbal bath	
Solanaceae	30.* <i>Lycopersicon esculentum</i> Mill., Enaana (NPK026)	H	C	Anemia, Lethargy,	3	Fr	Eaten as snacks or prepared in sauce	
				Inappetence				
Tiliaceae	31.* <i>Corchorus olitarius</i> L., (NPK004)	Mutele	H	C/W	Constipation, Anaemia,	4	L <sub>f</sub>	Prepared in groundnut paste & eaten as sauce daily
				Lethargy, Inappetence				
Apiaceae	32. <i>Steganotaenia araliacea</i> Hochust., Kibundubundu (NPK091)	S	C/W	Dizziness,	1	B	Dried powder added to a cup of tea or boiled in milk tea and is taken thrice daily	
				Inappetence				
Unidentified	33.Kagaya	H	C/W	Stomach pain	1	W	Dried powder added to a cup of tea.	

**Key:** \* Plant is nutritional and medicinal; **Life form:** H =herb, S =shrub, T =tree, Cl=climber, Mu=mushroom; **Part used:** L<sub>f</sub> = Fresh leaves, L<sub>d</sub> = Dry leaves), Rt =root, Fr= fruit, Se=seeds, B=bark, Fl=flower, W=whole; **Conservation status:** W=wild; C=cultivated; C/W=semi wild; **NC** =not collected, **FM**=Frequency of mention

Note: Unless otherwise stated, all the boiling of herbs is done in water.

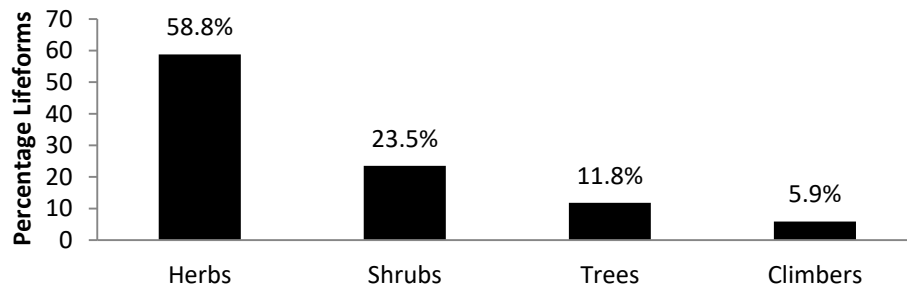


Figure 1: Life Forms of Medicinal Plants Used

Herbs (58.8%) were the most used plant life forms, while climbers (5.9%) were the least used life forms (Figure 1).

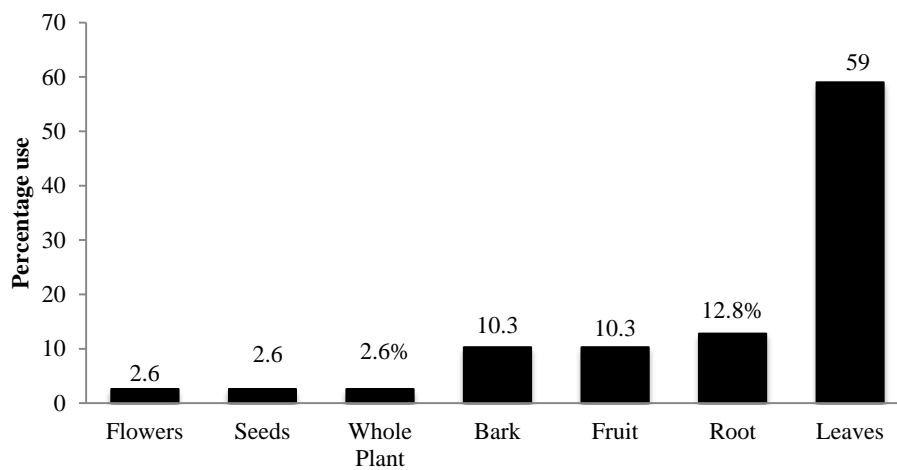
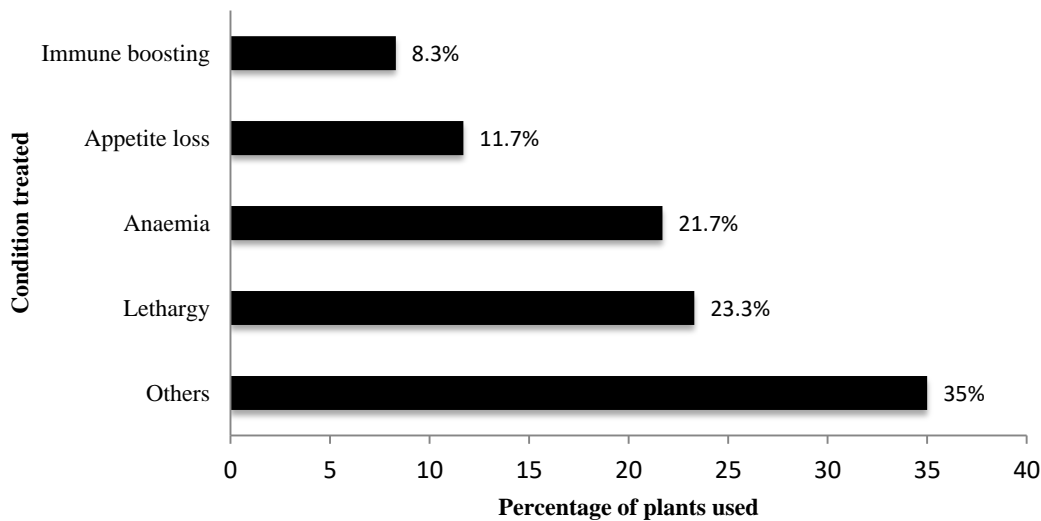


Figure 2: Parts of Plants Used

Leaves are the most commonly used plant parts (59%), followed by roots (12.8%) and the least used are the flowers (2.6%) and seeds (2.6%) (Figure 2)



**Figure 3:** Common Conditions Managed by Plant Species among Pregnant Women in Easter Uganda

## Discussion

The practice of using medicinal plants during pregnancy is still wide spread in Namungalwe, even though the services of TBAs are banned in Uganda. This is not surprising because the ban touches on their livelihoods but does not deal with the underlying reasons for the preference of the services of TBAs, and how best to integrate them. Indeed, studies in other parts of Uganda<sup>28-30</sup>, and African countries such as Malawi<sup>15</sup> Nigeria<sup>31</sup> and even Asia<sup>32</sup> have reported the preference of TBAs by mothers. Interestingly, even men have been found to actively seek the services of TBAs and utilize them for their wives' healthcare within the community in Uganda<sup>29</sup>. This makes the services of TBAs important in getting men involved in the pregnancy care. The TBAs perform 47–52 % of all deliveries in some remote districts of Uganda<sup>33</sup>. Several reasons have been advanced for this preference, however in one Ugandan study<sup>28</sup>, the predominant reason reported by both TBAs and pregnant women was verbal and physical abuse by local doctors and nurses.

The use of leaves is a common phenomenon, possibly due to their availability and ease of access as has been shown in various studies in Africa<sup>20,8</sup>. The use of medicinal plants as

food and medicine is also practiced elsewhere in pregnant women for example in South Africa<sup>18</sup> and Côte d'Ivoire<sup>34</sup>. Many wild food plants used for medicinal purposes contain a variety of secondary compounds such as anthocyanins, phenols and antioxidants among others<sup>35</sup> and essential nutrients, which are useful for both foetal development and mother's health<sup>19</sup>. The domestication of some medicinal plants by TBAs has also been reported in Côte d'Ivoire<sup>34</sup> and Uganda<sup>35</sup>.

Most of the medicinal plants species documented are used to treat anaemia. Anaemia is also one of the commonest conditions treated with medicinal plants by pregnant women in other African countries, such as Kenya<sup>10</sup> and Malawi<sup>36</sup>.

The World Health Organisation defined nutritional anaemia as a condition in which the haemoglobin content of the blood is lower than normal as a result of a deficiency of one or more essential nutrients, regardless of the cause of such deficiency<sup>38</sup>. Anaemia in pregnancy is a common problem in most developing countries and a major cause of morbidity and mortality mainly in malaria endemic areas<sup>38, 39</sup>. The prevalence of anaemia among pregnant women in sub-Saharan Africa was 46% in 2011<sup>39</sup>. In Uganda, anaemia was the second leading cause of morbidity during



pregnancy next to malaria<sup>39</sup>, at 34.4% in 2011<sup>39</sup>.

*Hibiscus sabdarifa* is one of the commonest plant species used in treating anaemia in Uganda. It has positive immunostimulatory effects<sup>40, 41</sup>. *H. sabdariffa* significantly increased erythrocyte indices particularly hemoglobin (Hb) concentration and red blood cell count at 2 ml/kg in rats and the white blood cell count<sup>41</sup>.

*Dicliptera laxata* is used for treating anaemia among preschool children in eastern Uganda<sup>7</sup>, Cameroon<sup>43</sup>, dysentery in Uganda<sup>44</sup> and cholorectal cancer in Kenya<sup>45</sup>. *D. laxata* has anti-inflammatory and antinociceptive activities *in vivo*<sup>45</sup>.

*A. spinosus* has been shown to have laxative and bronchodilatory effects *in vitro*<sup>47</sup>. *A. spinosus* contains rutin<sup>46</sup>, which is widely acknowledged for its nutraceutical effects and several pharmacological effects<sup>48</sup> such as antifatigue<sup>49</sup>, immunostimulatory<sup>50</sup> among others. *A. hybridus* was shown to be very nutritious containing several vitamins including thiamine, riboflavin, niacin, pyridoxine, ascorbic acid and tocopherol, in addition to 17 amino acids such as isoleucine, leucine, lysine, methionine among others<sup>51</sup>. *Amaranthus dubius* is also used for anaemic children in Uganda<sup>7</sup>.

*Persea americana* leaves and bark are used to treat malaria, the bark for diarrhoea and the seeds to stop vomiting and treat anaemia among children below 5 years<sup>7</sup>. *P. americana* leaves contain antioxidants and quercetin, rutin, luteolin and isorhamnetin<sup>52</sup>.

*Vernonia amygdalina* leaves are eaten in eastern Uganda<sup>53</sup> but also used to treat fever, measles, amoebiasis, influenza, convulsions<sup>51</sup> and stomach ache<sup>7</sup>. Although malaria is one of the commonest diseases encountered during pregnancy, only *V. amygdalina* was reported to treat malaria, despite the large numbers of medicinal plants known for treating malaria throughout Uganda<sup>52, 55-57</sup>. Although several studies have documented the widespread use of *V. amygdalina* in treating malaria in Africa generally and Uganda specifically<sup>7, 55-57</sup>, it is surprising that only one medicinal plant was documented here. However, *V. amygdalina* has been shown to be relatively

effective in treating uncomplicated malaria with an associated adequate clinical response (ACR) at day 14 in 67% of cases in a clinical trial in western Uganda, albeit with complete parasite clearance in only 32% of those with ACR<sup>55</sup>. There was also no evidence of significant side effects or toxicity from the medication during the trial. Perhaps this could partly explain the great reliance on *V. amygdalina* for malaria treatment by the pregnant women.

In conclusion pregnant women and TBAs in Namungalwe widely use nutri-medicinal plants in the management of common ailments. These plants are used during pregnancy for both child development and good health among the pregnant women, despite the ban on TBAs. However, further research on the bioavailability of nutrients, efficacy and safety of the medicinal plants used by pregnant women should be done.

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## Authors Contribution

NAP and KMM participated in designing the protocol of the survey. NAP carried out research; AG participated in data analysis and writing the manuscript. All authors participated in reviewing the manuscript. All authors read and approved the final manuscript.

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