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Mothers, markets and medicine

The role of traditional herbal medicine in primary women and child health care in the Dar es Salaam region, Tanzania

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Abstract

Traditional medicine is still the most common primary healthcare used in Tanzania, especially among women. The ethnobotanical studies performed in Tanzania have not explored women's traditional medicine, with the result that we do not know that much about it, including if women's usage of medicinal plants create a threat against the medicinal flora's biodiversity or not. Field studies consisting of interviews and collections of medicinal plants were carried out in the Dar es Salaam region in Tanzania before identifying the collected specimens by DNA barcoding, literature and morphology in Uppsala, Sweden. The 33 informants belonged to 15 different ethnic groups and 79% of them had migrated to Dar es Salaam. A total of 249 plant species were mentioned for women's healthcare and 140 for children's healthcare. The medicinal plants frequently reported as used for women's health and childcare during structured interviews and free-listing exercises were *Senna occidentalis*/ *Cassia abbreviata*, *Zanthoxylum* sp., *Clausena anisata*, *Acalypha ornata* and *Ximenia* sp. The most salient uses of medicinal plants by women were during pregnancy, childbirth, menstruation, to induce abortion, and for cleansing infants and treating convulsions in children. Most of the fresh specimens were collected from disturbance vegetation. The informants having most interview answers in common were the market vendors, healers and herbalists and they were the only informants that mentioned species listed as vulnerable on the IUCN Red List of Threatened Species. These results were similar to the outcomes from studies of women's traditional health care in West Africa. Out of 343 collected specimens, 19% were identified by DNA barcoding and 33% by literature sources. Out of 98 voucher samples, 61% were identified by comparisons of morphology, results from DNA analysis and literature. DNA barcoding was necessary to use as method since most medicines were sold in powdered shape. With more time and experience it should be possible to chart the majority of the medicinal plants up to species level. A difference between medicinal plant harvest for domestic and commercial use was observed where the commercial harvesting meant a greater threat to the Tanzanian medicinal plant biodiversity due to unsustainable harvesting methods. Previous studies have shown that an increased commercial harvesting and trade of plants often result in a decreased biodiversity. High population growth and quick urbanization mean that domestic harvesting of women's medicinal plants will not be able to continue as previously and women in Tanzania will be more dependent on commercial trade for their traditional medicine.

Keywords

Tanzania, Dar es Salaam, Medicinal plants, Women, Traditional medicine, Conservation, Urbanization, Commercialization, Biodiversity, Ethnobotany

Cover photo: Woman outside of a traditional healer's reception, Dar es Salaam. Photo by Hanna Lindh

Introduction

Traditional medicine's importance in Africa

By 2050, the African population is forecast to rise to at least 2.4 billion and will continue to grow to 4.2 billion, four times its current size in the next 100 years (African Development Bank Group, 2014). The majority of Africa's inhabitants, up to 80%, relies on traditional medicine for their primary health care (World Health Organization, 2003). The biomedical healthcare is often limited. In some countries the ratio of traditional healers to population is 1:500 whereas the ratio of biomedical doctors to population is 1:40000, and in a way it is no surprise that traditional medicine is still very important (Abdullahi, 2011). There are approximately 5400 different medicinal plant species in Africa (Neuwinger, 2000). Africa's plant biodiversity together with a tradition of oral transferring of traditional knowledge from one generation to the next (World Health Organization, 2012), have created an environment with trusted traditional healers and herbalists that make business out of the medicinal flora (Oliver, 1960). Traditional medicine is accessible and affordable and plays a central role in African societies both through the history, as well as today (Njamen et al., 2013). Medicinal plants often have a practical size and function as trade goods even though the infrastructure of the country is limited (van der Geest and Reynolds Whyte, 1989). The profitability of medicinal plant trade combined with the popularity of traditional medicine have created concern among conservationists (Cunningham, 1993; Williams et al., 2000). Attractive species may be harvested with unsustainable methods and at a high rate, making them not being able to recover afterwards (Towns et al., 2014).

Traditional medicine in Tanzania

With more than 11000 plant species, of which 1100 are endemic, Tanzania has a diverse and rich flora (Mahunnah and Mshigeni, 1996). The traditional medicine plays a big role for the people in Tanzania with estimations of between 405 (Chhabra et al., 1993), 1100 (Pergola, 2003) and as much as 2500 used medicinal plant species (ITM, 2012). Tanzania is suffering from deforestation at a high rate, up to between 130000 and 500000 hectares each year (FAO, 2010). Several plant species risk disappearing permanently due to alteration of their biotopes by commercial harvesting (WHO et al., 1993). These include medicinal plants that need conservation attention and efforts urgently (Marshall, 1998). The demand of traditional medicine is increasing, both at a local and international level and the quick harvesting methods, which includes up-rooting and ring de-barking, becomes a threat against already vulnerable ecosystems (IUCN, 2015).

Medicinal plant trade is common all over Tanzania and has stable settlements in both the cities and in the rural areas (McMillen 2012). In the city centres there are market vendors selling medicines (Kahatano, 1997). Specific plant species are harvested because of their specific medicinal features, but also due to their symbolism and part in traditional occasions (Cunningham, 1993).

Tanzania's flora is in need of protection

A biodiversity hotspot must hold 30% or less of its original natural vegetation and a minimum of 1500 endemic vascular plants (Conservation International, 2014). Tanzania holds 6 biodiversity hotspots of this type. Out of Tanzania's total land area is around 43.7% set underneath some kind of protection. Globally endangered or threatened species can also be

found inside the country borders (UNEP, 2015). To take care of this given resource properly it is important to consider conservation efforts as one of the top aims with studies that focus on natural resources and ecosystems, including medicinal plants (Nasi et al., 2002).

Ecosystems are vulnerable due to negative impact from humans (Nasi et al., 2002). Tanzania has three main types of forests; woodlands, montane forests and mangroves. All of them have a rich flora, but pressure from human activities has decreased the number of plants in the field. Work has been done to reach conservation goals. A number of tree species have been protected by legislations that assure that they will not be harvested by anyone without the right permit (UNEP, 2015). The conservation efforts are important not only for the ecosystems sake, but also because the humans depend on the nearby forest. If plant species disappear from an area, so will potential medicinal plants (Kutalek and Prinz, 2005). If the medicines were not harvested from the wild and instead cultivated, it would mean a much smaller risk of extinction due to impact from humans (Hamilton, 2004).

A new type of traditional healthcare with consequences for the biodiversity

A result of an increasing human population is often urbanization. This generally leads up to commercialization of natural products since the people still want the same medicinal plants as they are used to (Rukangira, 2001). Tanzania's population is already 51 million and the population is growing fast (Countrymeters, 2015). So is also the case in the biggest city Dar es Salaam with an even higher population growth due to the high urbanization level. The demand for traditional medicine is high in cities like Dar es Salaam (Cunningham, 1993). Although people want to use the same medicines as before they moved to the city they might not be able to go to the forest themselves since it is now placed further from their home and too far away for them to be able to travel there regularly. Instead they will rely on the commercial trade of medicinal plants and buy their well-known plants at for example a medicinal market in the city. Commercialization has been documented to create a greater threat against the biodiversity of the medicinal plants than people that collect plants for their own use, living close by the forest (Hamilton, 2004).

In previous times the herbal medicine trade included primarily traditional medicine specialists. Medicinal plants from the wild were seen as a natural resource and overharvesting was avoided consciously. Today the traditional medicine trade involves commercial harvesters, more interested in their own monetary profit than the medicinal plants themselves. These harvesters come from both the informal and formal sector. The formal sector traders are the ones that supply the traditional medicine demand in the growing cities and the medicinal plants are more and more seen as a common, endless property resource (Cunningham, 1993). The traders and vendors selling the medicinal plants think first about their own profit and they seem to ignore the complete development (Mhame, 2000). If it continues in the same direction, this will end up in a great loss of medicinal plants harvested from the wild (Hamisy et al., 2002) due to a shortage of strategy in organising the commercial trade of traditional medicine from harvest to consumption (Mhame, 2000). The most threatened plant species are the ones that are slow growing and with roots and bark as most popular parts to get harvested (Schippman et al., 2002). When traditional health practitioners in Tanzania were asked to mention plants no longer available they did not know of any plants that had disappeared completely. Scarce species were easier to mention and they agreed on that it was a consequence of vendors' commercial harvesting (Nahashon, 2013).

Women's traditional medicine in Africa: Overlooked and unexplored

In a community there will be different groups that use and rate the close by nature and its resources differently (Dahlberg, 2014). When elaborating conservation strategies for an area it is relevant to take into account that the biodiversity might be threatened in different ways depending on in what way people harvest and use the accessible plants. As mentioned before, some may harvest for their own private uses and some with the purpose to make a business out of it. People in the same neighbourhood might have very diverse plant use habits, even married couples, depending on which sex they belong to (Towns et al., 2014).

We do not know that much about if men and women in Africa have different relations to traditional medicine. In fact the research on women's traditional medicine is a small research field with a lot of knowledge gaps that need to be filled (Towns and van Andel, 2014). This has been the case for a long time and most likely female ethnobotanical knowledge has been left out from scientific publications throughout the years. By excluding the women's expertise researchers have limited their results and insights in how diverse human knowledge systems and procedures can be (Towns, 2014). The greatest usage of plants take place within the households, by women, and the majority of this is non-monetary. Since it is not registered and official in some way it becomes invisible and is depreciated by strangers (Howard, 2003). At the same time men often have a higher access to community meeting places and also resources than their female neighbours (Iyam, 1996). Although it has been reported how women more and more become non-specialist sellers of traditional medicine (Cunningham, 1993) this has not been shown in the scientific publications.

Ethnobotanical studies have been affected by gender bias and male domination (Njamen et al., 2013). This have lead up to not only an over-representation of men's knowledge by ethnobotanists (Phillips et al., 1994), but also to policies and programmes of conservation that forget about women's traditional medicine. We cannot overlook that there may be specific female medicinal plant knowledge if we want to conserve the Tanzanian biodiversity successfully (UNEP, 2000).

What we do know of women's traditional health care in West Africa

Some research about women's traditional medicine has been conducted in West Africa. It has been documented that women do not only have domestic knowledge in medicinal plants. Women are also necessary for the commercial plant industry, both harvest and disposal, in several regions. This becomes clear in Ghana where it is documented that women even dominate and control the traditional medicine trade (van Andel et al., 2012). In Niger women and men listed the same number of plant species in a survey, but only with 30% of the species overlapping between the two genders (Guimbo et al., 2011). In Benin and Gabon, women and men have separated and quite stiff domains of knowledge in their social and work-based everyday life. Men tend to have their working place around the village or in another part of the city, not close to their home. Women on the other hand, have daily activities in their home area. This creates different access to different types of vegetation for the different sexes. In Gabon and Benin the visible result of this have been that women mainly use medicinal plants from human-influenced environments, close to their home, while men have a greater freedom in choosing where to get their plants from since they move more freely and further from their house (Towns et al., 2014).

The work in West Africa has made it clear that women are generally seen as an easily comparable and homogenous group. This might be misleading since it has been

documented that market women and women that are harvesting plants for their domestic needs, affect plant biodiversity differently. In Benin for example, rural women cited almost the same plants as urban women while the answers from the market women were the ones to stand out. The market women in Benin cited more vulnerable species. The reason for this was their access to different trade channels (Towns, 2014; Towns et al., 2014). Even though the market women often live far away from primary forests they have the possibility to get those species through their business and they might even be more likely to get primary forest plants than the woman living close to the forest since she might be too bound to her home to spend time on going to the forest for one special plant (van Andel et al., 2012; Towns et al., 2014).

What we do know of women's traditional health care in Tanzania

Research focusing on traditional medicine in Tanzania has a tendency to miss the female informants since the majority of the market vendors and traditional healers at the local markets are male (Nahashon, 2013). Not much research has been conducted about women's traditional medicine in Tanzania, but a few studies have been performed on the topic.

Studies about unsafe abortions in Tanzania highlights one procedure in which Tanzanian women use medicinal plants: abortion. The plants used were easy to get since they grew along the side of the road, in private plots and generally in places where people easily could pick them (Rasch et al., 2014).

Another case from Tanzania tells of Maasai women that have been mentioned selling plants in the Tanga and Dar es Salaam region. Among the 70 market vendors at the Kariakoo market in Dar es Salaam, the majority were Maasai women which got their supplies from Maasai men (Kahatano, 1997).

Except for these two cases women's traditional health and childcare in Tanzania seem to be quite unexplored at the moment.

The importance of correct identifications

There are several ways of identifying plants. When high-lighting which plant species that are most used by people and therefor potentially most threatened, it is important to get the species identification right. Especially since the goal often is to try to conserve the exploited species (de Boer et al., 2014).

When medicinal plants are traded in dry areas, such as Tanzania, they are mostly in the shape of barks and roots (Bellakhdar, 1997; de Boer et al., 2014). Some say that Tanzanians use fresh plants when self-medicating, but that there is little commercial request for them since they often are growing close to the customer's homes. Therefor there are mainly roots and barks from plants growing in remote areas on the markets since they are harder to self-collect for the consumers (McMillen, 2008). These plant parts are hard to identify using morphological characters. Market vendors have a different way of classifying plants than scientists. They are often experts in the plants properties rather than the plants in the wild. Studies have shown that they tend to give one group of species one vernacular name, which describes their medicinal properties and uses instead of individual names to each different species. This makes it hard for a botanist to identify the medicinal plants by the vernacular names given from the herbalist (Bellakhdar, 1997; de Boer et al., 2014). It happens that people make identifications and either under- or over-differentiate (Martin, 2004). One vernacular name can sometimes refer to a whole genus of plants. It is also relevant to mention that the different tribes in Tanzania have their own languages and thereby their own

vernacular names for each plant. This complicates the identification procedure even more (Nahashon, 2013). In these cases, the molecular taxonomic method of DNA barcoding can be of great help, using interspecific genetic variation to identify different species (Hebert et al., 2003; DeSalle, 2005; de Boer et al., 2014). Several successful identifications by DNA barcoding give the method reliability (Gonzalez et al, 2009; Kress et al., 2009; Costion et al., 2011). Even so the results by DNA barcoding is restricted since the sequence databases used are not always complete (Kool et al., 2012; de Boer et al., 2014). The risk is also that the species studied are related in such a way that the barcoding will not manage to distinguish between them (Parmentier, 2013).

Research questions and expectations

To get a clearer picture of women and children's traditional medicine in Tanzania I focused on the following research questions: 1) *Which medicinal plants are used by women and children in Tanzania and for what purpose?* 2) *Are there similarities between these plants and other plants with medicinal properties used by women in other countries, where people mainly rely on traditional medicine for their primary healthcare?* 3) *Is it possible to identify collected medicinal plants by means of DNA barcoding?* 4) *What are the possible conservation issues and solutions related to women's medicinal plant use in Tanzania?* I expected women to use different plants depending on their life situation. Women living in the rural parts were forecast to use more vulnerable plants from bigger forests than the women living in urban areas. These urban women were expected to be more dependent on medicinal markets in the city and less self-collecting than the rural women who had a shorter distance to the forests. This based on the research of Hamilton (2004). I wanted to compare our own results to the study by Towns (2014) in West Africa where they saw that secondary vegetation is the main source for women and children's medicinal plants and that the ones most likely to use vulnerable plant species are market women, even though they are staying far away from the forest where the plants normally grow. Tanzania has a drier climate than Benin and Gabon and the question was if this leads up to that people are more dependent on powdered medicine in Tanzania while the women in West Africa are more relying on fresh plants throughout the year. This could create differences between women's traditional medicine in the different regions. I expected DNA barcoding to be a suitable method for identification of medicinal plants due to the results from Kool et al. (2012). I presumed that different groups of women would have a bigger conservation impact than others depending on how close they lived to forests with threatened species, but we still expected that they would be bound to their homes and therefor cultivate plants and use plants from disturbance vegetation (Towns et al., 2014).

Material and methods

Study areas

Tanzania consists of the mainland Tanganyika and the Zanzibar archipelago. The country is the biggest in East Africa with its 947300 km^2 (Central Intelligence Agency, 2015) and is positioned right below the equator, bordering the Indian Ocean. The mainland consists of a plateau landscape with wide grasslands, but also extensive forests in the southern and western parts. There are also tropical rain forests at the hills of the mountains in the east with great biodiversity (Utrikespolitiska Institutet, 2011). Tanzania has a total population of 51 million (Countrymeters, 2015) and a life expectancy of 62 years in 2013 (Gapminder, 2013). The population is growing with approximately 500000 persons per 6 months (Countrymeters, 2015). The total fertility ranges up to 5.2 children per woman and the child mortality reaches 52 per 1000 kids (Gapminder, 2013). Tanzania is often seen as one of the world's poorest countries (Utrikespolitiska Institutet, 2011). However, it is also one of the countries that has increased its Human Development Index (HDI) the most since 2000 (UNDP, 2013).

Figure 2. Map of Tanzania with study sites/interview localities outside of Dar es Salaam (Countrywatch, 2015)

Research was conducted in the Dar es Salaam region in the eastern part of Tanzania. A city with 4 million inhabitants and one of the most fast-growing cities in the world, placed in Africa, the continent with the highest urbanization rate of our days (African Development Bank Group, 2014). We worked in both the city centre of Dar es Salaam at the medicinal markets in Kariakoo and Manzeze, but also in Mchikichini, Temeke, Tabata, Ubungo and Kagera. The research also took place in rural areas surrounding the city like the villages of Ubena Zomozi and Miono in the Bagamoyo district and the village Kunduchi.

Figure 3. Map of study sites/interview localities in Dar es Salaam (Google maps, 2015)

Sample collection and interviews

All interviews were conducted in Swahili under assistance of an interpreter. The search for informants started at the medicinal market in Kariakoo, Dar es Salaam where the first to be interviewed were market vendors. The interviews were semi-structured. Two separate questionnaires, adapted from Towns and van Andel (2014), were used for the interviews about Women's healthcare and Children's healthcare. Some of the informants were found by snow-ball-sampling. One informant gave us the address to the next one. But in many cases we found the informants by asking random people on the street if they knew of someone knowledgeable in women's traditional medicine. After interviewing the market vendors we conducted interviews with traditional healers, herbalists with their own clinics, Maasai women selling herbal medicines on the street and other women with knowledge in medicinal plants. The interviews were performed in shops at medicinal markets, on sidewalks, in cafés, herbalist clinics and traditional healer's receptions, in the informant's home and wherever the informant found it suitable. All the informants were found in the Dar es Salaam region, Tanzania in April and May 2015. To get a result that covered both rural and urban women we included different parts of the city, the city centre as well as the outskirts of Dar es Salaam and we also spent time in a few rural villages surrounding the city. The questionnaires that we used were designed after standard ethnobotanical methods (Martin, 2004). The informants were asked to mention specific plants for specific health conditions. Free-listing of women and children's medicinal plants and illnesses were also performed (Towns, 2014). In connection to the interviews, collections of the mentioned plants were made for future identifications. The informant, if possible, either sold the mentioned plant in powder form to us or showed us the fresh plant in the field for collection. The collected medicines were brought to Uppsala University in Sweden for identifications. Their duplicates were left at the herbarium of MUHAS in Dar es Salaam.

DNA barcoding analysis

To identify the plants, we tried to match vernacular names of the collected plants with literature to find out the scientific names. The herbarium vouchers were studied for further possible species identification. DNA barcoding was performed to make the identification process easier and the results more reliable. In some cases the DNA-analysis was necessary for the identification since the plant was in powder shape and did not have a reference in the literature. To be able to analyse the specimens DNA we wanted to amplify their Internal Transcribed Spacer (ITS) Region since it had been proved to be successful in previous studies on medicinal plants (Kool et al., 2012).

Total DNA from plant material was extracted by using Carlson/Yoon DNA isolation protocol (Yoon et al., 1991) with some modifications. 0.04 grams of plant material was added into 2 ml Eppendorf tubes and if needed homogenized by a Mini-Beadbeater-1 (Biospec Products Inc, 2015) with help from silica beads. The tubes were shaken by the Mini-Beadbeater-1 for 30 seconds before a mixture of 750 µl Carlson Lysis Buffer and 1.5 µl mercaptoetanol per sample was added to the fragmented samples. Thereafter the regular protocol was followed. Although, during centrifugation steps the samples were centrifuged for 15 minutes at 12.000 rpm. No NaOAc was added, instead isopropanol was added in the same amount as two thirds of the water phase volume and the samples were left in the freezer overnight for precipitating the DNA. After one night, the water phase was removed and 750 µl of wash buffer consisting of 76% EtOH, 10mM ammouniumacetate was added to each tube, which got centrifuged before 50-100 µl of elution buffer consisting of deionised water was added. The samples were kept in the fridge overnight to dissolve the DNA-pellet.

The DNA concentration was measured by using a Qubit fluorimeter (Invitrogen, 2015). The samples in which DNA had been successfully extracted were kept for the upcoming PCR-reaction.

A PCR-mixture with the volume of 25 µl was prepared, consisting of 14.25 µl H_2O, 3.5 µl 10xPCR buffer containing 15 mM $MgCl_2$ (Qiagen, 2015), 0.5 µl 10 mM dNTP (Bioline, 2015), 0.125 µl Taq DNA Polymerase (5 U/µl) (Qiagen, 2015), 0.125 µl 2% BSA (Roche Diagnostic, 2015), 2.5 µl 5 pM Internal Transcribed Spacer (ITS) Region Primer Forward (Sun et al., 1994), 2.5 µl 5 pM ITS Region Primer Reverse (Sigma-Aldrich, 2015) and 1,5 µl DNA template per sample was made and pipetted into 0.2 ml PCR tubes for thermal cycling. One tube was left without template to constitute a negative control.

The PCR conditions included: denaturation initially at 95°C for 5 min. This was followed up by 35 cycles of denaturation, annealing and elongation at 95 ºC for 30 s, 55 °C for 1 min and 72 °C for 1 min. The last elongation step was at 72 °C for 10 min.

To see if the PCR had been successful we ran 3 µl of each PCR amplified DNA sample together with 2 µl loading buffer mixed with GelRed through a 1.5% agarose gel in 1xTAE buffer. The Gel electrophoresis was performed for 30 minutes at 100 V before the fragments were examined by using UV-light. The PCR products were cleaned by adding 3µl 8x diluted ExoSAP-IT and running them in a thermocycler for 30 minutes on 37˚C and 10 minutes on 80˚C. The samples were thereafter given an addition of 5 µl 5 pM Internal Transcribed Spacer (ITS) Region Primer Forward or 5 µl 5 pM ITS Region Primer Reverse (Sun et al., 1994; Sigma-Aldrich, 2015). The sequencing was carried out by Macrogen (Macrogen, 2015). Trace files were coordinated with the programs preGap4 and Gap4 (Gap, 2015) from the Staden package (Staden, 2015). Thereafter the sequences were blasted in The National Center for Biotechnology Information (NCBI) open access database, GenBank

(Pruitt et al., 2005). The results from the DNA barcoding were compared to the ones from the morphological and the literature analysis. To reach the consensus identification we studied the percentage of the DNA-identification match, compared different sources of literature to each other and in the cases where a herbarium voucher was available we could examine the two first identifications.

Ethics statement

The Code of Ethics of the International Society of Ethnobiology was studied and the study was conducted according to their guidelines (International Society of Ethnobiology, 2006). The study was designed in collaboration with the Institute for Traditional Medicine (ITM) at Muhimbili University of Health and Allied Sciences (MUHAS) in Dar es Salaam. Research permits, residence permits and plant export permits were all obtained. A consent form, emphasizing the purpose and structure of the study, was designed with help from MUHAS and its content was explained to the informant that if approving it signed the form before starting the interview. Two duplicates were signed, one for the informant to keep and one for the author. The informants were compensated equally for their cooperation.

Results

Data and sample collections

We conducted 34 questionnaires in total, 19 about women's health and 15 about childcare. The questionnaires were performed with 33 informants, 10 male and 23 female. One informant answered to both questionnaires. The informants were found in both the urban and rural parts of the Dar es Salaam region and they belonged to 15 different ethnicities; Kwere (18%), Maasai (18%), Shambaa (9%), Zigua (6%), Nyamwezi (6%), Luguru (6%), Zaramo (6%), Haya (6%), Pogolo (3%), Pare (3%), Chagga (3%), Nyiramba (3%), Pangwa (3%) and Ndengereko (3%) (SIL International, 2015) and Manyema (3%) (Iliffe, 1979). One dominating characteristic among the informants was that 79% of them had migrated to Dar es Salaam from other regions of Tanzania. Some went to the city for work, but lived outside of the city centre. Although many of the informants were found in the crowded streets of Kariakoo they had a close connection to the countryside.

In the interviews, the informants mentioned 249 vernacular plant names for women's healthcare and 140 for women's childcare. In the end 343 specimens were compiled, 48% in powdered shape, 28% as herbarium vouchers and 24% consisted of barks, dried seeds, liquids, stones and fresh samples that we did not have the opportunity to make herbarium vouchers out of. Several of the mentioned plants were collected two times or more since some informants offered the plants in powder form while others guided us to fresh samples. 208 of the mentioned plants were left out. The reason why not all mentioned plants were gathered was that not all of them were available. Some plants grew only in another part of Tanzania according to the informant and a majority of them referred to their place of birth. Some informants admitted that the plant may be did grow in Dar es Salaam or close to the city, but that they only knew where to find it in their home village. A number of plants mentioned were not collected since we considered them to be generally known crops, such as tomato, avocado or garlic. Sometimes the informant did not have time or energy to bring us to the field and in some cases the informant wanted more money than we could offer them and therefor did not wanted to continue their participation in the study. A few informants were suspicious towards us. One traditional healer thought that we would lie to her and use the information that we got

from her to start our own medicinal business. One rural woman thought that we asked for plants that could cause abortion or anticonception for own uses and therefor became a bit hesitant to provide us any further information. A few of the informants got upset by the question about medicinal plants for abortion and were eager to tell us that they would never use such a plant if they knew of it.

When informants were interviewed about medicinal plants for women's healthcare, 20 of the 249 named plants were mentioned 6 times or more (Table 1). 150 of the vernacular names were only mentioned once. Among these was *Dalbergia melanoxylon* Guill. & Perr., reported to be near threatened by IUCN, mentioned once by a market vendor (IUCN, 2015). The informants knew of medicinal plants to treat the majority of the health ailments that were included in the questionnaire. A majority of the informants did not know of plants for enemas and only two informants thought that there were sexually transmitted diseases that plants could not cure. Of the top mentioned species *Senna occidentalis* (L.) Link*/Cassia abbreviata* Oliv. (Facciola, 1998), *Harrisonia abyssinica* Oliv./*Ficus sycomorus* L. (Prota4u, 2015), *Albizia anthelmintica* Brongn. (Orwa et al., 2009), *Ricinus communis* L. (Facciola, 1998), *Azadirachta indica* A.Juss (Orwa et al., 2009), *Annona senegalensis* Pers. (Uphof, 1959), *Trigonella foenum-graecum* L. (Harrison et al., 1975), *Hibiscus sabdariffa* L. (Facciola, 1990) were all edible plants, normally used in cooking. They were all known medicinal plants. Among the frequently mentioned species, the medicinal plant *Spirostachys Africana* Sond. is protected since it is a popular timber species that have been harvested at an unsustainable rate (Sabi Sabi Private Game Reserve, 2015). None of the above mentioned plants are on the IUCN Red List of Threatened Species. *Warburgia* sp. on the other hand, had two possible species identifications. The first one, *Warburgia stuhlmannii* Engl. is listed as vulnerable due to overharvesting of the plant for its medical qualities and a decrease of its natural habitat due to the increasing agriculture. The second one, *Warburgia elongata* Verdc. is endemic to Tanzania and listed as endangered (IUCN, 2015). *Warburgia* sp. was only mentioned by male market vendors. *S. africana* was mentioned by both male and female informants, all of them either market vendors or traditional healers. *Keetia venosa* (Oliv.) Bridson (Otieno et al., 2015) and *Hymenaea verrucosa* Gaertn. (Nahashon, 2013) are reported to have medicinal uses, but are not edible.

It was hard to examine the plants only identified up to genus level since different plants of a genus may have different conservation statuses and uses. One example was *Aloe* sp. We knew that all *Aloe* species except for the cultivated *Aloe vera* (L.) Burm.f. are CITES-listed (CITES, 2015). The problem was that this made it impossible for us to bring the *Aloe* samples to Uppsala for identification. The vernacular name *Aloe vera* was mentioned by both male and female informants and we do not know if they meant different species from the 400-species *Aloe* genus (IUCN, 2012), which contains several endangered species (IUCN, 2015), or if they all spoke of the cultivated, edible food plant *Aloe vera* (L.) Burm.f. (Kunkel, 1984).

Table 1. The 20 most frequently mentioned plants by informants answering women's healthcare questionnaire in Swahili (Sw), Zigua (Zg), Maasai (Ms), Kwere (Kw), Shambaa (Sh) language.

Scientific name	**Family**	**Frequency**	**Main use**	**Local name**	**Source**
Zanthoxylum sp.	Rutaceae	38	Anaemia, STDs, Right after birth	Mjafari (Sw) /Mwale (Zg)/Oloisuki (Ms)	Literature, Herbarium voucher
Senna occidentalis (L.) Link [1.]/*Cassia abbreviata* Oliv.	Fabaceae	20	Hypertension, Abortion, HIV/AIDS,	Mkundekunde (Sw) /Mlundalunda (Sw)/Olsingwai (Ms)	DNA, Herbarium voucher, Literature
Ximenia sp.	Olacaceae	16	Menstruation, Pregnancy, Right after birth	Mpingi (Sw)/Engamai (Ms)	Literature
Acacia sp.	Fabaceae	13	Menstruation	Kiloriti (Ms)	Literature
Harrisonia abyssinica Oliv./*Ficus sycomorus* L.[2]	Annonaceae/ Moraceae [2.]	11	Infertility	Mkunju (Kw) /Engiloilo (Ms)/ Mkuso (Zg)	DNA, Literature, Herbarium voucher
Aloe sp.	Asphodelaceae	10	Abortion, Menstruation	Aloe vera (Sw)	Literature
Atriplex sp.	Chenopodiaceae	9	Right before birth	Mfunguo (Sw)	Literature, Herbarium voucher
Hymenaea verrucosa Gaertn.	Fabaceae	9	Milk production, Pregnancy	Mkumbi (Sw)/Olbukoi (Ms)	Literature
Albizia anthelmintica Brongn.	Fabaceae	8	STDs, Enemas	Mfuleta (Kw)/Olmukutan (Ms)	Literature
Keetia venosa (Oliv.) Bridson	Rubiaceae	8	Menstruation, Sepsis rupture, Haemorrhage/Miscarriage	Mkandachuma (Sw)	Literature
Ricinus communis L.	Euphorbiaceae	8	Anti-conception, Menstruation	Nyonyo (Sw)	Literature, Herbarium voucher
Abrus sp.	Fabaceae	7	Right before birth	Ufjambo (Sw)/Rufambu (Kw)	DNA, Herbarium voucher
Hugonia arborescens Mildbr.	Linaceae	7	Haemorrhage/Miscarriage	Nyambu (Zg)	Literature
Azadirachta indica A.Juss.	Meliaceae	7	Abortion, HIV/AIDS	Mwarobaini (Sw)	Literature
Annona senegalensis Pers.	Annonaceae	6	Pregnancy	Mtopetope (Sw)	Literature
Warburgia sp.	Canellaceae	6	Abortion	Mwifu (Zg/Sh)	Literature
Trigonella foenum-graecum L.	Fabaceae	6	Right after birth	Uwatu (Sw)	Literature, Morphology
Hibiscus sabdariffa L.	Malvaceae	6	Anaemia	Rozela (Sw)/Damdam (Sw)	Literature, Herbarium voucher
Cyphostemma sp.	Vitaceae	6	Infertility, Pregnancy	Mwengele (Zg/Sw)	DNA, Literature, Herbarium voucher
Spirostachys africana Sond.	Euphorbiaceae	6	Anti-conception	Mkulo (Sh)/Muharaka (Kw/Zg)	Literature

[1.] Identified by one separate *Mkundekunde* (Sw) herbarium voucher. [2.] Identified by one separate *Mkunju* (Kw) herbarium voucher. Language abbreviations: Swahili (Sw); Zigua (Zg); Maasai (Ms); Kwere (Kw) and Shambaa (Sh).

When informants were interviewed about medicinal plants for childcare, 15 of the 140 named plants were mentioned 5 times or more (Table 2). 80 of the vernacular names were only mentioned once. Among these was *Dalbergia melanoxylon* Guill. & Perr., reported to be near threatened by IUCN, mentioned once by a market vendor/traditional healer (IUCN, 2015). The informants knew of medicinal plants to treat the majority of the health ailments that were included in the questionnaire. No plants were mentioned for albino children. A majority of the informants did not know of specific plants for girls and boys, plants for male/female circumcision, plants for handicapped children, plants to get twins, plants for enemas and plants used depending in which order and position a child is born. *Zanthoxylum* sp. was the most mentioned plant for both the women's and children's questionnaire informants. *S. occidentalis/C. abbreviata*, *Ximenia* sp. and *Acacia* sp. were all on the top mentioned list for both women's and children's questionnaire informants. Plants popular specifically for the childcare questionnaire informants such as *Clausena anisata* (Willd.) Hook.f. ex Benth. (Uphof, 1959), *Ocimum* sp. (Bianchini et al., 1988), *Sclerocarya birrea* (A.Rich) Hochst. (Burkill, 1985), *Adansonia digitata* L. (Orwa et al., 2009), *Psidium guajava* L. (Orwa et al., 2009), *Acalypha ornata* Hochst. ex A.Rich.and *Sterculia appendiculata* K. Schum (Ruffo et al., 2002) were all edible plants, normally used in cooking. They were all known medicinal plants. *Suregada zanzibariensis* Baill. was known to have medicinal properties and was used for its timber, but not edible (Bosch, 2008). None of the top mentioned childcare questionnaire plants were in the IUCN Red List of Threatened Species.

Table 2. The 15 most frequently mentioned plants by informants answering women's childcare questionnaire in Swahili (Sw), Maasai (Ms), Kwere (Kw) language.

Scientific name	**Family**	**Frequency mentioned**	**Main use**	**Local name**	**Source**
Zanthoxylum sp.	Rutaceae	18	Respiratory problems, New born	Oloisuki (Ms)/Mjafari (Sw)	Literature, Herbarium voucher
Clausena anisata (Willd.) Hook.f. ex Benth.	Rutaceae	13	Convulsions	Mkomavikali (Sw)	Literature
Ocimum sp.	Lamiaceae	12	Convulsions, Fever, Bathing	Kivumbasi (Sw)	Literature, Herbarium voucher
Sclerocarya birrea (A.Rich.) Hochst.	Anacardiaceae	11	Developing babies, Bathing, Skinny or sickly children	Mngongo (Sw)	Literature
Psidium guajava L.	Myrtaceae	10	Diarrhoea	Mpera (Sw)/Lasera (Ms)	Literature, DNA, Herbarium voucher
Acacia sp.	Fabaceae	9	Developing babies, Female circumsision, Diarrhoea	Kiloriti (Ms)	Literature
Adansonia digitata L.	Bombacaceae	9	Bathing, skinny or sickly children	Mbuyu (Sw)	Literature, Herbarium voucher
-	Aquifoliaceae	9	Constipation, New born	Lenjeku (Ms)/Neshekuye (Ms)	DNA
Senna occidentalis (L.) Link [1.]/*Cassia abbreviata* Oliv.	Fabaceae	9	Constipation, New born, Bathing	Olsingwai (Ms)/Mkundekunde (Sw)	Literature, DNA, Herbarium voucher
Ximenia sp.	Olacaceae	7	Fever, Umbilical cord, Diarrhoea	Mpingi (Sw)/Engamai (Ms)	Literature
Acalypha ornata Hochst. ex A.Rich.	Euphorbiaceae	6	Convulsions	Mfulwe (Sw)	Literature
-	-	5	Developing babies	Lupande (Ms)	-
Suregada zanzibariensis Baill.	Euphorbiaceae	5	Fever	Mdimupori (Sw)	Literature, DNA, Herbarium voucher
Uvaria sp.	Annonaceae	5	Convulsion, Skinny or sickly children	Msofu (Sw)	Literature
Sterculia appendiculata K. Schum.	Stericuliaceae S	5	New born, Protection, Bathing	Mgude (Kw)	Literature

[1.] Identified by one separate *Mkundekunde* (Sw) herbarium voucher. Language abbreviations: Swahili (Sw); Maasai (Ms) and Kwere (Kw).

When the informants were asked to mention the three top situations when a woman would use medicinal plants as her cure the answers varied. 18 different categories were mentioned. The top situations concerned irregular or painful menstruation, infertility problems or just a raise in the fertility to get pregnant faster and the local expression *chango* that included many types of ache such as problems related to the female reproductive system. Other examples of situations mentioned are evil spirits, vaginal fungus and constipation. Several illnesses were only mentioned by one informant, but situations as fibroids, stomach ache and childbirth were all mentioned by several informants (Figure 4).

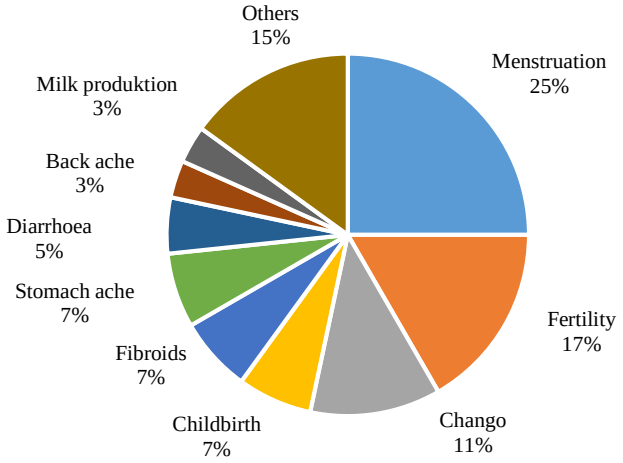

Figure 4. Diagram showing the frequency (%) of answers given by informants in Dar es Salaam when they were asked to mention three health situations when a woman would use traditional medicine as her treatment

When the informants were asked to mention the three top situations when a woman would use medicinal plants to treat her child, the answers varied. 14 different categories were mentioned. The top situations concerned illnesses like convulsions, respiratory problems, high fever and malaria, skin rashes like chickenpox, the local expression *chango* that described children's colic, diarrhoea and stomach ache (Figure 5). Scenarios mentioned once were constipation, malnutrition, tiredness and eye problems, vomiting, urinary tract infection and the case of a bleeding umbilical cord (Figure 5).

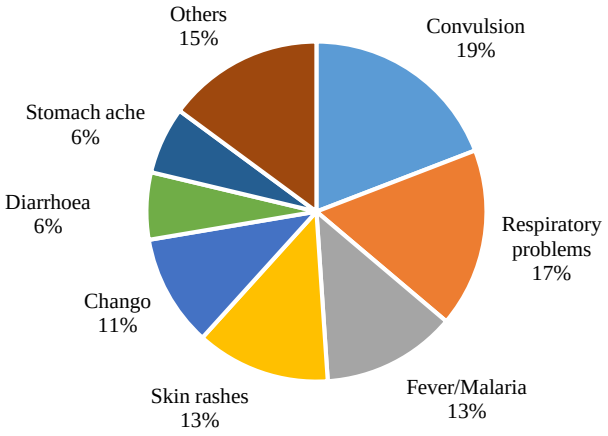

Figure 5. Diagram showing the frequency (%) of answers given by informants in Dar es Salaam when they were asked to mention three health situations when a woman would use traditional medicine as her child's treatment

When the informants were asked to mention 3 plants used for women's reproductive health, 42 different vernacular names were mentioned. A majority of them were only mentioned by one informant, but a few of the names were mentioned more than one time (Table 3). The only species listed that was not already listed in the top most mentioned plants was *Dombeya rotundifolia* (Hochst.) Planch. It is a known medicinal plant, but also edible and used for its timber (Prota4u, 2015). It is listed in the IUCN Red List of Threatened Species as a plant set under lower risk/least concern, but has not been evaluated since 1998 (IUCN, 2015).

Table 3. Table showing most common answers given by informants in Dar es Salaam when they were asked to mention three plants used for women's reproductive health.

Vernacular name	**Scientific name**	**Percentage**
Mpingi (Sw)/Engamai (Ms)	Olacaceae *Ximenia* sp.	10%
Olsingwai (Ms)/Mkundekunde (Sw)/Mlundalunda (Sw)	Fabaceae *Cassia abbreviata* Oliv./*Senna occidentalis* (L.) Link [1.]	9%
Oloisuki (Ms)/Mjafari (Sw)	Rutaceae *Zanthoxylum* sp.	9%
Mkirika (Sw)	Malvaceae *Dombeya* sp./Boraginaceae *Ehretia* sp. [2.]	4%
Mjata (Zg)	Malvaceae *Dombeya rotundifolia* (Hochst.) Planch.	4%
Mtopetope (Sw)	Annonaceae *Annona senegalensis* Pers.	4%
Others	Others	60%

[1.] Identified by one separate *Mkundekunde* (Sw) herbarium voucher. [2.] Two different species with the same vernacular name according to the identifications. Language abbreviations: Swahili (Sw); Zigua (Zg) and Maasai (Ms).

When the informants were asked to mention 3 plants used for children's healthcare, 42 different vernacular names were mentioned. The majority of the plants was only mentioned by one informant, but a few of the names were mentioned more than one time (Table 4). The only species listed that was not already listed in the top most mentioned plants was *Ozoroa mucronata* (Bernh.) R. Fern. & A. Fern., which is mentioned in previous reports as being used for medicine (Yamagiwa, 1987; Ahmed, 2013).

Table 4. Table showing most common answers given by informants in Dar es Salaam when they were asked to mention three plants used for children's healthcare.

Vernacular name	**Scientific name**	**Percentage**
Oloisuki (Ms)/Mjafari (Sw)	Rutaceae *Zanthoxylum* sp.	7%
Neshekuye (Ms)/Lenjeku (Ms)	Aquifoliaceae	7%
Mtundwi (Zg)/Mpingi (Sw)/Engamai (Ms)	Olacaceae *Ximenia* sp.	7%
Mfulwe (Sw)	Euphorbiaceae *Acalypha ornata* Hochst. ex A.Rich.	4%
Mkomavikali (Sw)	Rutaceae *Clausena anisata* (Willd.) Hook.f. ex Benth.	4%
Mvunja (k/h-oma) (Sw)	Anacardiaceae *Ozoroa mucronata* (Bernh.) R. Fern. & A. Fern	4%
Olsingwai (Ms)/Mkundekunde (Sw)	Fabaceae *Cassia abbreviata* Oliv./*Senna occidentalis* (L.) Link [1.]	4%
Others		63%

[1.] Identified by one separate *Mkundekunde* (Sw) herbarium voucher. Language abbreviations: Swahili (Sw); Zigua (Zg) and Maasai (Ms).

Among the free-listed plants *Zanthoxylum* sp., *Ximenia* sp. and *C. abbreviata*. /*S. occidentalis* were on the top mentioned list for both women's health and childcare questionnaires.

122 fresh plants were collected, with guidance of informants. 50% of them came from human altered disturbance vegetation. This included ditches, roadsides and backyards. These habitats were all close to human settlements. Some informants had recently moved to Dar es Salaam and they did not know where their mentioned plants grew in their new neighbourhood. Some of them asked someone still living at their place of birth to send them the medicinal plants. Other informants went collecting for their business outside of the city and then took the opportunity to catch some of the plants that they had mentioned during their interview. In these cases the informants either did not know exactly in what type of vegetation the plants had been harvested or they did not feel certain enough to tell for each plant they had harvested. We knew that the delivered plants came from rural areas containing both forest and shrubland, but some of the plants might have been harvested from other vegetation types that we do not know of.

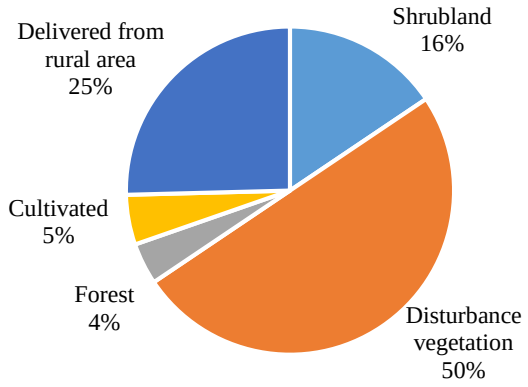

Figure 6. Diagram showing the vegetation type the 122 fresh specimens were collected from

Data analysis

We tried to perform DNA barcoding on all our 343 collected specimens. Since we were under time constraints we only had time for one extraction per sample. In the end we had managed to extract DNA from 66% of the samples. These we tried to amplify by PCR. 25% of the samples were successfully amplified and sent off for sequencing. In the end we had sequencing and blast results for 19% of our collected samples, good enough to identify some specimens down to genus level and some even to species level.

33% of the collected specimens were identified only or partly by literature sources. 15% of the mentioned, but non-collected species, were matched with scientific names by their vernacular names.

We managed to produce 98 voucher samples out of the fresh specimens that we collected. We managed to identify 61% of our voucher specimens by comparing the results from the DNA barcoding and literature studies to the morphology of the collected plant. An expert in East African plants assisted during the analysis of the herbarium vouchers.

Discussion

Medicinal plants used by women and children in Tanzania

Among the top 20 most frequently mentioned plants by the women's healthcare informants, pregnancy, childbirth, menstruation and abortion were the most common main uses. The fact that remedies are well-known for these situations indicate that these health situations are among the most common scenarios when a woman would choose traditional medicine as her treatment. The fertility rate in Tanzania is relatively high (Gapminder, 2013), but infertility is still a problem in Africa with rates up to 30-40% in some regions. The infertile women become victims of stigmatization, economic deprivation and banishment. It comes as no surprise that the common remedies all are related to pregnancies and fertility in some way since women always have tried to control or enhance their fertility (van Andel et al., 2012). A regular and normal menstrual cycle is used as an indication of that a woman is fertile and healthy in many cultures (Levin, 2001), Tanzania seems to be no exception since plants controlling the menstruation are popular. Abortion comes as a consequence to the many and not always planned pregnancies. Since abortions are illegal in Tanzania people rely on the traditional medicines (Rasch et al., 2014). However the reason for that our informants spoke of the same abortion-plants may have indicated that they chose to speak of plants that were commonly known which would not make them seem more knowledgeable in abortion plants than anyone else.

The dominating plant family among the most mentioned plants for women's healthcare was Fabaceae, the second biggest plant family of all angiosperm families with plants used as food, fodder, medicines and for several other purposes. Most of the plants were edible and known medicinal plants, but some were also used for timber such as the IUCN red-listed *Warburgia* sp. (IUCN, 2015). The most mentioned plants from the total women's questionnaire were among the most mentioned plants during the free-listing exercise. Since these plants were mentioned many times for specific purposes and also were frequently appearing when the informants got the question about "typical medicinal plants for women's health" we can estimate that plants as *C. abbreviata*/*S. occidentalis* and *Zanthoxylum* sp. are commonly used medicinal plants among women in Dar es Salaam. We only listed the 20 most popular plants, but the diversity in species was much more extensive. 249 different plant names were mentioned by the informants and 150 of the vernacular names were only mentioned once. During the free-listing activities, 42 different vernacular names were mentioned by 19 informants (Appendix I). The fact that only a few plants were mentioned more than once give a hint of how enormous, diverse and also well-known the Tanzanian medicinal flora is. It has been reported to hold 2500 used medicinal plant species (ITM, 2012), but since the female medicinal flora are unexplored and only our little study alone gave these diverse results it might be even bigger.

Among the top 15 mentioned plants for childcare the most common uses were convulsions and bathing which we thereby could read of as common situations when women would treat their children with medicinal plants. No plant family was outstanding as much more commonly mentioned than the others, but as well as for the women's questionnaire the majority of the top mentioned plants were edible. The plants that we managed to identify up to species level were all known medicinal plants. No plants were vulnerable or protected in some way. Although we did not manage to identify two of the top mentioned plants more than up to family level for one of them and for those plants we cannot tell if they were vulnerable

species or not. Among the free-listed medicinal plants for women's childcare only one plant was not mentioned among the total questionnaire top 15 mentioned plants. Plants as *C. anisata*, *A. ornata*, *C. abbreviata*/*S. occidentalis* and *Zanthoxylum* sp. could then be presumed to be commonly used medicinal plants for childcare in Dar es Salaam. We only listed the 15 most popular plants, but 140 different plant names were mentioned by the informants in total. 80 of the vernacular names were only mentioned once and during the free-listing activities 42 different vernacular names were mentioned by 15 informants. The childcare-questionnaire results were similar to the women's questionnaire in the way that only a few plants were mentioned more than once. In the same way it show the extensity of the Tanzanian medicinal flora (ITM, 2012) and tell of a diversity in plants used for women's childcare.

Different results depending on differences between informants

Some of the top mentioned plants were the same for the women's and children's questionnaires, both in whole and among the free-listed plants only, but not for the same causes. Since we only had one informant that replied both the questionnaires the reason could not be that the same informants mentioned the same plants two times. Instead we saw that the most popular plants, with one exception, were exclusively mentioned by people working with medicinal plants in some way. This included market vendors, traditional healers and herbalists. Although a majority of them were male, they represented different sexes, ethnicities and age groups. The commercial informants seemed to be the group with most plant knowledge in common, mentioning the same remedies for their customers. These results indicate that there are specific commercial plants. Since the vulnerable or protected species were mentioned by commercial informants exclusively, we can also see that as an indication of that the commercial informants deal with more vulnerable plant species than the other informants.

The diversity in answers from the women's and children's questionnaires might be too big to say that they are able to represent women's traditional health and childcare in Tanzania. Especially since they to a great extent seemed to represent the commercial branch of women's medicinal plants rather than an entireness.

We thought that the amount of new plant names would at some point decrease for each interview considering data saturation curves (Mason, 2010), but this was not the case. Each informant mentioned new plants. The fact that the informants mentioned so many vernacular names only once and the overall diversity in answers among the non-commercial informants might have several explanations. First of all previous studies have experienced how challenging it can be to do interviews with another linguistic background than the informant. Names mentioned once, similar to more common ones could be the same, results of multiple phonetic interpretations of plant names by the author (Towns, 2014). The diversity of answers could be a result of a variety in medicinal plant species, ethnicities and informants originating from different parts of Tanzania. We included only 15 different ethnicities of Tanzania's 120. Still we saw differences between the answers of informants from different tribes and similarities within the ethnic groups. When we managed to identify some of the plants we saw that there were many cases of overlapping although it was not clear from the start since the different tribes with their different languages had different vernacular names for the plants. In other cases there were clear distinctions between the ethnic groups with different plants for different situations. Some questions were only replied by informants from a certain ethnicity. For example the Maasai women knew of plants for female circumcision while other informants did not know it still occurred in Tanzania. The medicinal plant traditions should be

different in different Tanzanian areas since they consist of different biotopes with different floras. A reason for the fact that so many different medicinal plants are used for women's health might be that tribes have not been in contact with each other about medicinal plant use (Tishkoff et al., 2007). It is clear that a lot of female medicinal knowledge is regardless of what ethnic group the informants belong to, but at the same time it seems to be specific medicinal plants used by women only from one or a few tribes. To get a valid result of what women's traditional medicine in Tanzania is, it might be necessary to perform different studies on women from all the ethnic groups and then compile and analyse the results.

The questionnaires and suggestions for future studies

Some informants mentioned a plant only during the free-listing and not as a cure for a certain illness mentioned in the questionnaire. This was especially the case in the children's questionnaire which had as many free-listed plant names as the women's questionnaire, but only 140 answers in total compared to the women's 249. Perhaps the informant thought about a specific health situation for the free-listed plant that did not show up during the interview. We did not ask the informants what they used the plants, they only mentioned during the free-listing, for. Something that could be a suggestion to do in a future similar study. The questionnaires were designed to be suitable for the research in Benin and Gabon (Towns and van Andel, 2014) and were not modified more than slightly to suit the Tanzanian conditions. They were kept similar to the originals in order to allow a comparison between the results from the different African countries. It is most likely that the traditional medicine cultures in East and West Africa are quite different since the areas have different climates, biotopes and plants. Our answers from the free listing of health situations when women would use medicinal plants for themselves or their children included several scenarios that were not included in the questionnaires that we used. One example was the local expression *chango*, which was said to describe women's reproductive system problems and children's colic. To come up with a more covering and special designed questionnaire adapted specifically for women's traditional medicine in Tanzania we need to be aware of such situations as *chango*. We also need to be aware of what *chango* and other expressions mean practically to be able to tell the questions in a correct way. Women's reproductive system problems seem for a non-Tanzanian person as the author unspecific and broad while the informants spoke of it as something well known and common. To get a good picture of what plants the informants use we need to ask them about all the situations when they normally use medicinal plants.

The identification procedure

We did not manage to collect all mentioned plants. Therefor it became hard for us to identify them. If we did not manage to match a vernacular name to a scientific name, we had no voucher specimen identification to support the literature results with. The lack of literature about local medicinal plant names in some of the smaller or less-studied Tanzanian tribes made it impossible to match some of the vernacular names with scientific names.

We got some reliable identification performed by DNA barcoding, but we did not manage to identify all the collected plants. DNA barcoding was conducted with all the 343 collected samples, but out of them we only managed to extract, amplify, sequence and blast 19% samples. By these only a few had results good enough to make an identification up to genus and in some cases species level. It seems as if the step where the DNA barcoding failed mainly was at the extraction step since only 66% out of 343 samples were successfully

extracted. The fact that we had a lack of fresh specimens might have affected the results. A majority of the collected samples were in dried shape, sometimes powdered. The DNA could have been degraded in these specimens and harder to extract. It has been reported in previous studies on medicinal plants that fresh material is easier to do DNA barcoding analysis with rather than dried market samples (Kool et al., 2012). In some cases the specimen was in liquid, crystal or solid shape. It was hard to tell if the material was organic or some kind of mineral. Since the DNA extractions did not work perfectly for both these samples and obvious plant material samples we could not tell if the specimens were plants or some kind of mineral by the results from the DNA-extraction. The PCR step also seems to have been determining for the results since only 85 samples out of 228 were amplified as planned. The reason for that we had troubles with the amplifications might be the fact that we only used one genetic marker. Studies with more clear DNA-identifications have often been able to use several genetic markers and thereby been able to try which one that was most suitable for their specific plant material (Kool et al., 2012). It has also been documented that secondary metabolites that medicinal plants hold can have an inhibiting effect on the PCR (Peterson, 2004). One of the major reasons that it was not possible to identify more specimens was that the author had not more than a limited experience of DNA barcoding before the start of the project and time constraints left little possibility for re-extraction using an adapted protocol, PCR troubleshooting and resequencing. The relatively few DNA-identifications that we ended up with were still helpful in our final identifications and since the powdered medicines are common among the medicines sold for women at medicinal markets in Tanzania it is clear to us that the DNA barcoding is a necessary tool to use when going further in the exploration of women's traditional medicine in Tanzania.

We had several cases when the DNA-, morphology- and literature-analysis gave different species results. This might be due to under-differentiation which means that the informants might fail in distinguishing between closely related or similar species (Downie et al., 2000; Downie et al., 2001). Many of the plants have similar morphology and if the informant not even collect the plant from the wild herself and only get a root or piece of bark from a supplier, which has been reported to be the case in other studies of medicinal plants, then the risk of making mistakes might grow (Kool et al., 2012). It can also be a case of over-differentiation where one plant has several names (Bellakhdar, 1997). A reason for this might be that market vendors and others dealing with medicinal plants are more interested in the plant's medicinal properties rather than the actual plant. Therefor they might give plants used for one health situation one specific name even though the plants are not related at all (Kool et al., 2012). It has been documented that market vendors in North Africa, dealing with medicinal plants sometimes make identifications and either under- or over-differentiate (Kool et al., 2012; de Boer et al., 2014). Similar results have been reported from previous studies in Tanzania (Nahashon, 2013). In the cases when we had been able to collect the plant we could examine the voucher and tell if the plants with the same vernacular name were the same or not, but in the cases when we only had a powder or no collected specimen at all it became hard to tell what species the informant had actually meant. In the cases when we had only several literature results it became hard to tell which one of them that was the right one for our collected specimen. If they all spoke of the same family or genus we could at least manage to identify the plant up to genus or family level. Sometimes the literature results even spoke of different families for one vernacular name. If we had a voucher or DNA-result to compare the literature with it was possible to see which literature result that was the correct one, but if not the identification became impossible.

Women's traditional medicine and a threatened Tanzanian biodiversity

One of the objectives with the study was to investigate if there were conservation issues related to women's traditional medicine in Tanzania. The relatively low amount of reliable identifications made it hard for us to examine the majority of the mentioned plants' scientific names and thereby we could not find out if they were threatened or not. It was not that helpful to only know the plant family or genus since the different species often are many and all with different conservation statuses. Although we could tell that *Aloe* sp. for example might include endangered species. We did not get a perfect picture of these half-way identified plants, but it was still more helpful to know their genus or family rather than not having any information at all available.

Our species identifications that we were able to examine through a conservation perspective showed us that the vulnerable species were few and mentioned by commercial informants only, but there is a possibility that the unidentified vernacular names given by other informants also included vulnerable plants.

Overharvesting threatens rare or endemic plants, which are often growing in specific vegetation types such as primary forests. Plants growing in human altered environments, disturbance vegetation or cultivated tend to grow faster, with short life spans, and with a wide distribution. This makes the harvesting from human altered vegetation a better way of collecting medicinal plants through a biodiversity point of view (Brown and Lugo, 1990). During our voucher collections, we recorded the vegetation type from which the medicinal plants were harvested. 50% of the collected fresh plants came from human altered disturbance vegetation and 5% were cultivated. Food crops such as tomato, garlic and papaya were mentioned as medicinal plants. The line between what worked as an edible and a medicinal plant seemed to be vague or just different from that in the western world. Although tomatoes have for example been reported to decrease the risk for getting cancer, osteoporosis and cardiovascular disease among many other illnesses (Debjit et al., 2012). Garlic has been used for its medical properties for thousands of years. In the west nowadays it is most known for preventing heart diseases and raising the immune system (University of Maryland Medical Center, 2015). Papaya has been documented to have antibacterial, antifungal and antiviral properties. It can be used for numerous health situations, for example blood pressure, constipation, stimulation of reproductive organs and glandular tumors (Aravind et al., 2013). Consequently it seems as if many plants that the western world often see as only food plants have medicinal properties both according to scientific reports, but also according to the Tanzanian women. Women often spend much time close to the home, cultivating and not with that much freedom of movement. If a family member gets ill it is important to have the medication accessible and if a crop as tomato is cultivated in the garden and the woman know its medicinal properties that should be the first plant to use as a treatment. The fact that the majority of our fresh specimens were collected in human altered vegetation types could be a result of the fact that we spent most of our time in the city where other habitats are further away. Only a small part of the vouchers came from either forest or shrubland, but since 25% of the fresh samples were collected without us being present we cannot say from what habitats they came from. All we know is that they were collected in rural areas, but during the few field collections that we did in rural areas ourselves the vegetation types varied between forest, shrubland and disturbance vegetation. It seemed as if even though the informant lived on the countryside with access to the forest it was still more convenient to collect plants from the area closest to the home. If our results are representative and women in the Dar es Salaam

region rely more on medicinal plants from human altered vegetation types that would mean a hopeful result according to the future of the medicinal flora in Tanzania. This would mean that these plants probably would be able to regenerate and the loss of vulnerable species would be less than if they were harvested from primary forest vegetation (Towns, 2014).

Effects of urbanization on medicinal plant use

We had a hard time distinguishing rural and urban informants since 79% of the informants had migrated to the city from different areas of Tanzania. We did some interviews on the countryside, but too few to be able to compare the results from the informants in the urban and rural areas. On the other hand we could observe the former rural informants in their new home city Dar es Salaam and how this affected their usage of medicinal plants. We met informants living in the middle of the city with a great knowledge of medicinal plants, but when we asked them if they could bring us to these plants they said that they only knew where they grew in their home village. Their birth place often meant a place too far away for us being able to travel there such as villages in the Arusha, Tanga, Morogoro, Kagera, Kilimanjaro, Tabora, Pwani, Kigoma, Singida, Njombe and Iringa regions. We even had an informant from the Lilongwe region in Malawi. They said that the plants were not available in Dar es Salaam, but further in the study, we could collect the mentioned plant with another informant not far from the first one. It is hard to tell how many of the plants that were actually not accessible in Dar es Salaam since they may have grown in a specific vegetation type and climate somewhere else in Tanzania, but at the same time might have been growing in the city although the informants just did not know. Some informants reported that they had stopped using medicinal plants since they moved to the city, others got deliveries from relatives still living in their home village. We do not know why they needed the plant specifically from their birth place, if this meant that the certain plants grew in a primary forest close to their home village or if their neighbor cultivated it. The interview answers from informants living in the rural versus the urban parts of the Dar es Salaam region did not differ more than the answers between urban informants from different ethnicities did. They both mentioned crops as well as forest species and said that they picked the plants themselves if the plants were reachable. Instead the group that stood out was the group of commercial informants mentioning more vulnerable species than any of the other informants. They were willing to travel for their plant harvesting since they needed a great amount of plants and were dependent on them for not only their own health, but for their business. Due to the picture of informants not being able to find the medicinal plants they are used to by themselves in their new neighbourhood and the great amount of people selling and treating with medicinal plants in Dar es Salaam, we can estimate that the new female inhabitants of the city will search for their traditional medicine by relying on the medicinal plant trade. We saw female customers at the traditional healers' receptions as well as buying powders from the market vendors or Maasai women. Sometimes seeking healthcare for their own sake, but often being there to get treatment for their children.

McMillen (2008) writes that the reason for that Tanzanians self-medicate with fresh plants and at the same time buy other plants in dry shape at the market is the fact that the market medicines are growing inaccessible for the majority of the customers. The plants growing close to human settlements have not been commercialized since everyone can get them for free. One clear example of differences between harvest for domestic and commercial use we experienced by following one informant when she first picked plants that she used to treat her family with and thereafter travelled with her to the shrubland where she normally

harvested plants for her business. It was not necessarily different species, but she could find greater quantities of plants for her business from the shrubland, prepare them to be long-lasting as powders and then be settled for a long time. The plants for her family were all collected not more than 5 minutes away from her home. It was mainly plants growing either cultivated or in disturbance vegetation. The informant told us that she used these plants when needed, when someone actually showed symptoms of being ill. In these cases she did not need to plan and prepare the harvesting as she did with the commercial collections. The plants for her business she compiled together with a colleague. They travelled for hours to a certain shrubland and there they used tools to dig up roots, cut of branches and debark trees with. They returned to the same area when they needed to fill up the medicinal plant shop's storage. This second example seemed to put much more pressure on the plants than the first one. The informant we followed did not harvest extremely huge quantities at the time when we participated, but she always returned to the same area, which could mean that the plants probably would have a hard time recovering if it continued for too long. She told us that she always asked the trees for permission before harvesting from them, meaning that she tried to be careful and not overharvest from one tree. However we saw trees with almost half of its bark gone that would have a hard time surviving if the treatment continued in the same way. At the same time, the informant said that others that do business with medicinal plants are not as aware as she of the wellbeing of the plants. This indicates that she was extra careful compared to other commercial harvesters. This type of heavy harvesting at one time to prepare for all types of illnesses that the customers may come to suffer from should be more damaging for a plant than a little at the time when someone is in the need of the medicine. The conclusion from this and other similar scenarios that we experienced was that: since commercial harvesters are dependent on the plants for their living they might also prefer to get a fast profit out of it and harvest as much as possible once they are in the field rather than harvesting carefully and in a more sustainable way as they may do for their private uses, where they also should use more fresh plants since they harvested them because of the on-going health situation.

The Tanzanian women we met during our study used and trusted in the strength of medicinal plants. The urbanization and their new life in the city of Dar es Salaam had pulled them away from the forest, shrubland or garden that they had previously gotten their medicinal plants from. Since the amount of medicinal plants within the city boundaries seemed to be limited and the city population keep on growing they probably will be more and more dependent on the medicinal market (Countrymeters, 2015). Some might stop using medicinal plants while others will get deliveries from their relatives back home, but as the first generation of migrants are gone and their children have grown up within the city boundaries the bond to the rural areas should be less and less strong. If the future women then are as interested in traditional medicine as the women in Dar es Salaam today, the disturbance vegetation where some of the informants collected fresh medicinal plants from will not be enough to satisfy the growing Tanzanian population that is expected to grow with up to 500 000 more persons per 6 months (Countrymeters, 2015). The urban women that want to use medicinal plants will probably be as bound to their homes as the women of today. They will not have time to go to the rural areas for collections each time they need a medicine. Instead they will probably have to buy them from a medicinal market. With a growing population, urbanization and thereby a commercialization and our results that showed that the commercial informants mentioned the most vulnerable plant species this seems as a worrying development through a conservation perspective. It seems as the commercial trade of

women's medicinal plants in Tanzania is a greater threat to the medicinal biodiversity than the domestic uses of traditional medicine and it also seems as if the commercial trade will increase. More research needs to be performed on women's traditional medicine in Tanzania. Women seem to be as dependent on medicinal plants as their male family members and as their traditional medicine culture will be more and more commercialized it would be devastating to miss the medicinal plants used for women's reproductive health in Tanzania when analysing how the medicinal plant trade affect the biodiversity and planning conservation efforts.

Women's traditional medicine in East and West Africa

We saw similarities between our results and the results from the studies in West Africa. First of all we experienced a great ethnic diversity among our informants. van Andel et al. (2012) made the same observation on the medicinal markets in Ghana. Since the majority of the plants sold on the Ghanaian markets were used for women's health we should be able to compare those results with our own even though we specifically studied women's traditional medicine which they did not do in Ghana. Species used as both medicinal plants and spices were popular trade goods in Ghana. This is something that we also saw in our results. We did not manage to identify a majority of our species more than up to genus level. Therefor a detailed comparison between species used in West Africa and Tanzania became hard to perform. On the other hand we could see that for example *Zanthoxylum* sp. was on both the women's and children's top mentioned plants list in Tanzania and popular on markets in Ghana. In Ghana it was used to strengthen pregnant women. In Tanzania several different uses were reported, but scenarios that could occur during pregnancies and for development of the child inside the mother dominated. It seemed as if the uses of *Zanthoxylum* sp. in Ghana and Tanzania were quite similar. *Ocimum* sp. was among the most popular plants on the markets in Ghana and at the same time it figured on our list of most frequently mentioned plants for women's childcare. (van Andel et al., 2012). The studies in Benin and Gabon also had *Ocimum* sp. as one of the most frequently cited plants for children's traditional medicine. *Senna* sp. was also commonly used by women in all three countries. *Uvaria* sp. was cited in a high frequency in Benin and Tanzania. *Psidium guajava* L. was used almost exclusively for children in both Tanzania, Benin and Gabon (Towns, 2014). The fact that plants as *Ocimum* sp. was sold on herbal markets in Ghana (van Andel et al., 2012) and used for women's childcare in West African countries as Gabon and Benin (Towns, 2014) and East African countries as Tanzania shows that even though the countries are very different in climate and culture they still have a lot in common when it comes to women's traditional medicine. The results that showed that so many genus and also species were cited as common plants for either women or children in several different countries indicate that our results were partly representative for women's health and childcare not only in Tanzania, but also in other African countries with similar floras. However it would be precipitant to conclude that *Ocimum* sp., and other species mentioned in both West and East African studies, can be presumed to constitute a common childcare plant in the whole of Africa just because it was common in three studies including Benin, Gabon, Ghana and Tanzania. More extensive research on women's traditional medicine needs to be done before we can tell for sure if specific plants can be seen as "African women's medicinal plants".

Another clear example of similarity between West and East African female traditional medicine was that cultivated food crops such as banana, guava and papaya were seen as medicinal plants. Studies from both sides of the continent experienced that the

collected samples overall came mostly from human altered vegetation types, such as disturbance vegetation or cultivated gardens (Towns, 2014). Previous studies had reported that Maasai women dominated the medicinal trade in the Dar es Salaam city part Kariakoo (Kahatano, 1997), but we saw no women selling plant medicines at the medicinal market in Kariakoo. Nevertheless we noted their presence in the commercial plant industry in Dar es Salaam as vendors, herbalists and healers. This harmonized with the results from West Africa speaking of women's importance for the medicinal plant trade and industry (van Andel et al., 2012). The West African research showed that it is a problem that we see women as a homogenous group since there are several different groups of women with different relationships to traditional medicine, for example market women and women harvesting plants for their own uses (van Andel et al., 2012; Towns, 2014). We experienced the same thing in our study, but for us it became clear that the informants with different ethnic background were the ones that were problematic to see as one big group with the same characteristics. We also saw that commercial informants had most in common when it came to mention plant species. They were the ones that mentioned most vulnerable plant species and this was also the case in West Africa. In the same way as in Tanzania the West African authors experienced that women not working with medicinal plant trade were not likely traveling to remote areas for harvesting of possibly vulnerable species. This due to gender roles that kept them near their house taking care of the household (Towns, 2014). The fact that so many similarities were found between the studies in West Africa and our own study show that some parts of women's traditional medicine are independent of the location. The gender roles seem to be similar between the two regions and the determining factor that decides from where the women would get their medicines from. Even though there are great cultural differences, women tend to spend most of their time close to their home in both Benin and Tanzania. This result in very similar medicinal traditions for East and West African women where it seems as if general women, not working with medicinal plant trade, create a relatively small threat against the medicinal flora. This could mean that conservation programmes including women's traditional medicine species in Gabon and Benin could be successful in Tanzania as well.

Conclusions

The diversity of used medicinal plants for women and their children in Tanzania is large. We did not get enough satisfying identification results to give a final result of which women's medicinal plants are used for what in Tanzania. The plants most popular according to this study were however *C. abbreviata*/*S. occidentalis* and *Zanthoxylum* sp. for women's healthcare and *C. anisata*, *A. ornata*, *C. abbreviata*/*S. occidentalis* and *Zanthoxylum* sp. for their childcare. *Zanthoxylum* sp., *Ximenia* sp. and *C. abbreviata*. /*S. occidentalis* were most cited during the free-listing exercises for both women's health and childcare. Even though we cannot say with certainty that these plants represent women's traditional medicine in Tanzania they should still be able to give a foretaste of what the results from a more extensive study could look like.

We can tell that plants from human altered vegetation types as well as commonly known crops are used normally by women self-collecting their medicinal plants. There are differences in medicinal plant use between women from different tribes. They had not only different vernacular names for the plants which made the study more complicated, they also came from different parts of the country with different biotopes, plants and traditional medicine traditions. In this case the different tribes have too many individual features to be seen as one homogenous Tanzanian people. To speak of women's traditional health and childcare in Tanzania, several studies would be needed, one for each ethnic group, from which the results then could be compiled into one final result.

The studies from West Africa (van Andel et al., 2012; Towns, 2014) and our study showed that several medicinal plant genus and species, used by women, are the same in the two regions even though they are very different when it comes to climate conditions and vegetation types. It also made it clear that human altered vegetation types are the areas where women self-collect most of their plants from, both if they grow up in West or East Africa. We also noted that the commercial informants were the ones most likely to deal with vulnerable plant species in both the regions while women not working with medicinal plants did not have a big conservation impact on the medicinal flora. These results show that women's traditional medicine in the different regions have a lot in common. The cultures might be different and the distance between the countries huge, but the medicinal plant knowledge of women is similar. This could be a result of that gender roles limit women in both regions and make them dependent of their close up areas such as gardens and disturbance vegetation close to their homes. The fact that our results had so much in common with the results from the studies in West Africa tell us that conservation programmes including women's traditional medicine species in Gabon and Benin could be successful in Tanzania as well.

We tried to identify all samples by DNA barcoding, but only a few of these identifications were successful. The powdered samples might not have been ideal for DNA-analyses, but at the same time we did not have an alternative method since they were powdered and had no morphological features that could be used for other types of identification. It was also clear that the DNA-results were helpful when making a final identification after studying the literature and herbarium vouchers. With a few successful DNA-results and other studies with more positive outcomes, we feel hopeful for future studies with more time. With a majority of powdered medicinal plants and a huge language diversity which make reliable literature results hard to find we think that DNA barcoding is the most suitable method for identifications of medicinal plants now, and in the upcoming years.

Market vendors, traditional healers and herbalists had a different set of answers than the other informants. Independent from if they were male or female they reported a different and more homogenous set of plants than the other informants. Some of the most mentioned women's plants were exclusively mentioned by commercial informants and vulnerable species were only mentioned by either healers, herbalists or vendors (IUCN, 2015). The high migration rate to the city had taken the informants from their well-known surroundings where they knew where the medicinal plants grew. We saw that there were medicinal plants growing in Dar es Salaam, but since the city is continuing to grow on a high rate the question is if these plants will be enough for the population's needs. The longer the families stay in the city, the more they will be away from their home villages. Their children will grow up in the city and probably not have the same bond and relations to the people in their parents' birth place as the older generation. In this case it would be possible that the amount of medicinal plant deliveries to the city, that we experienced, would decrease in the future. The children of the women that previously harvested their own medicinal plants are therefor expected to rely more and more on medicinal markets, herbalists and healers for their medicinal plants. Therefor we conclude that the urbanization and commercialization of women's traditional medicine in Tanzania creates a threat against their used medicinal flora. To get more precise and useful results for understanding and combating this development, more research in the field needs to be performed.

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Figure 7. Informants and author in front of *Adansonia digitata* L., Dar es Salaam. Photo by Leah Haule

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Appendix I. Results from interviews and identifications of collected and mentioned medicinal plants

Family	Species	Vernacular name	Use	Source
Amaranthaceae		Kinamata (Zg)	To make your husband nice and loving	DNA
Amaranthaceae	*Beta vulgaris L.*	Beetroot (En)	Anaemia. Right after childbirth	Informant
Amaryllidaceae	*Allium sativum* L.	Kitunguu (saumu)(Sw)	Hypertension. Pregnancy. Bathing children. Protection. Convulsions	Literature
Anacardiaceae		Mhombe (Sw)	STDs. Infertility	Literature
Anacardiaceae	*Sclerocarya birrea* (A.Rich.) Hochst.	Mngongo (Sw)	Hypertension. Right after childbirth	Literature
Anacardiaceae	*Sclerocarya birrea* (A.Rich.) Hochst.	Ormagongoi (Ms)	Miscarriage	Literature
Anacardiaceae	*Sclerocarya birrea* (A.Rich.) Hochst.	Mtula (Sw)	Free-listing	Literature
Anacardiaceae	*Lannea schweinfurthii* Engl.	Muhingiro (Zg)	Strengthen child. Bathing	Literature
Anacardiaceae	*Ozoroa mucronata* (Bernh.) R. Fern. & A. Fern.	Mvunja (Sw)	Free-listing. New born. Enemas. Children's fever/malaria	Literature
Anacardiaceae	*Ozoroa mucronata* (Bernh.) R. Fern. & A. Fern.	Mvunja k(h)oma (Sw)	New born. Enemas. Children's fever/malaria	Literature
Anacardiaceae	*Rhus dentata* Thunb.	Mjenga ua (Sw)	New born	Literature
Anacardiaceae Rhus	*Rhus dentata* Thunb.	Mgengauwa (Sw)	Bathing children	Literature
Anacardiaceae		Msada (Kw)	Umbilical cord	DNA
Anacardiaceae		Mwembepori (Sw)	Haemorrhage/Miscarriage	Literature
Anacardiaceae		Mhungiro (Zg)	Strengthen child. Bathing	Literature
Annonaceae	*Annona* sp.	Mtonkwe (Sh)	Protection	Literature
Annonaceae	*Annona senegalensis* Pers.	Mtopetope (Sw)	Free-listing. Pregnancy. Pregnancy (woman)	Literature
Annonaceae	*Annona senegalensis* Pers.	Mtopetope (Sw)	Free-listing. Menstruation	Literature
Annonaceae	*Uvaria* sp.	Msofu (Sw)	Umbilical cord. Skinny/sickly children.	Literature
Annonaceae	*Uvaria* sp.	Mdaha (Sw)	Coughing. Chest pain	Herbarium
Annonaceae	*Harrisonia abyssinica* Oliv.	Engiloilo (Ms)	Developing babies	DNA/Literature
Annonaceae	*Harrisonia abyssinica* Oliv.	Engilelo (Ms)	Constipation	Literature
Annonaceae	*Harrisonia abyssinica* Oliv.	Mkunjo (Sw)	New born. Infertility	Herbarium/Literature
Annonaceae	*Harrisonia abyssinica* Oliv.	Muhangalaja (Dr)	Strengthen child	Herbarium
Annonaceae	*Harrisonia abyssinica* Oliv.	Mkuso (Zg) / Mkunjo (Kw)	Stomach ache	Herbarium

Annonaceae	*Friesodielsia obovata* (Benth.) Verdc.	Mcharasi (Hy)	Free-listing	Literature
Apiaceae	*Cuminum cyminum* L.	Uzile	Vaginal cleaning.	DNA
Apocynaceae	*Holarrhena* sp.	Melemele (Kw)	STDs	Literature
Apocynaceae	*Hollarhena* sp.	Melemele (Kw)	Hypertension	Literature
Apocynaceae	*Hollarhena* sp.	Melemele (Kw)	Anaemia. STDs	Literature
Apocynaceae		?	Diarrhoea. Coughing	DNA/Herbarium
Arecaceae	*Cocos nucifera* L.	Mnazi (Sw)	Milk production	Literature
Asparagaceae	*Asparagus* sp.	Mwinamo (Sw)	To make your husband nice and loving	DNA
Asphodelaceae	*Aloe* sp.	Aloe Vera (Sw)	Abortion	Literature
Asphodelaceae	*Aloe* sp.	Aloe Vera (Sw)	Abortion	Literature
Asphodelaceae	*Aloe* sp.	Aloe Vera (Sw)	Anaemia	Literature
Asphodelaceae	*Aloe* sp.	Aloe Vera (Sw)	HIV/AIDS. Menstruation. Haemorrhage/Miscarriage. Abortion.	Literature
Asteraceae	*Launaea* sp.	Mchunga (Sw)	Prevent pregnancy	DNA/Herbarium
Asteraceae		Mlehani (Kw)	Position	DNA
Asteraceae	*Solanecio mannii* (Hook.f.) C.Jeffrey	Omogango (Hy)	Just before childbirth	DNA/Herbarium
Aquifoliaceae		Neshekuye (Ms)	3 plants for children. Haemorrhage	DNA
Aquifoliaceae		Lenjeku (Ms)	Free-listing. Developing babies. New born. Constipation. Convulsions.	Informant
Aquifoliaceae/Celasteraceae		Mkandachuma (Sw)	Menstruation. Haemorrhage. Sepsis rupture	Herbarium
Bombacaceae	*Adansonia digitata* L.	Mbuyu (Sw)	Bathing children. Making them fat and healthy	Herbarium/Literature
Boraginaceae	*Ehretia* sp.	Mkirika (Sw)	Pregnancy	DNA/Literature/Herbarium
Brassicaceae	*Brassica oleracea* L.	Red cabbage (En)	Anaemia	Informant
Burseaceae	*Commiphora* sp.	Mtwingi (Kw)	Infertility. Pregnancy	Literature
Burseraceae	*Commiphora* sp.	Mtwintwi (Zg)	Children's hernia. Infertility	Herbarium
Burseraceae	*Commiphora swynnertonii* Burtt	Oldemwai (Ms)	Diarrhoea	Literature
Cannelaceae	*Warburgia* sp.	Mwifu (Zg)	Abortion	Literature
Cannelaceae	*Warburgia* sp.	Sokonoi (Ms)	Developing babies	DNA/Literature
Cannelaceae	*Warburgia* sp.	Mwifu (Sh)	HIV/AIDS. Abortion.	Literature
Cannelaceae	*Warburgia* sp.	Mwufa (Kw)	Children's fever/malaria	Literature

Cannelaceae	*Warburgia ugandensis* Sprague	Mpadje (Sw)	Children's respiratory problems	Literature
Cannabaceae	*Cannabis sativa* L.	Kungulubari (Pg)	Free-listing	Informant
Capparaceae	*Cleome* sp.	Mgagani (Sh)	Free-listing. Vaginal cleaning	Herbarium/Literature
Capparaceae		Mguruka (Kw)	Convulsions	Literature
Caricaceae	*Carica papaya* L.	Papaidume (Sw)	New born	Literature
Caricaceae	*Carica papaya* L.	Papaya (En)	Children's fever/Malaria. Twins. STDs. Haemorrhage/Miscarriage. Milk production.	Literature
Celasteraceae	*Gymnosporia putterlickioides* Loes.	Mtulavua (Kw)	Infertility. Right before childbirth.	
Chenopodiaceae	*Atriplex* sp.	Mfunguo (Sw)	Free-listing. Infertility.	Literature
Chrysobalanaceae	*Parinari* sp.	Eva (Commercial name)/Harufu-Nzuri (Sw)	Infertility	DNA
Chrysobalanaceae	*Parinari* sp.	Mmbula (Kw)	Hiccups	Literature
Clusiaceae	*Garcinia buchananii* Baker	Omocharasi (Hy)	Free-listing	Herbarium
Combretaceae	*Terminalia sambesiaca* Engl. & Diels	Mtanga (Zg)	STDs	DNA
Combretaceae	*Combretum* sp.	Mlama (Sw)	Free-listing. Developing babies. Convulsions	Literature
Combretaceae	*Combretum* sp.	Mlama (Sw)	Women's chango	Literature
Combretaceae	*Combretum* sp.	Mlama (Sw)	Free-listing. Developing babies	Literature
Commelinaceae	*Commelina* sp.	Hongo (Zg)	Free-listing. Menstruation. Sepsis rupture	Herbarium
Commelinaceae	*Commelina* sp.	Kitezi (Hy)	Milk production	Herbarium
Compositae	*Bidens pilosa* L.	Mashonanguo (Sw)	Vaginal cleaning	Literature
Compositae	*Bidens pilosa* L.	Obukulura (Hy)	HIV/AIDS	DNA
Compositae	*Conyza pyrrhopappa* Sch.Bip. ex A.Rich.	Mshashu (Sh)	Free-listing	Literature
Compositae	*Aspilia africana* (Pers.) C.D.Adams	Mwuti (Sh)	New born	Literature
Compositae	*Artemisia afra* Jacq. ex Willd.	Fewe (Sh)	Children's fever/malaria	Literature
Compositae	*Tridax procumbens* (L.) L.	Joni (Hy)	STDs	DNA/Herbarium
Compositae	*Pluchea dioscoridis* (L.) DC.	Mnywenye (Zg)	Pregnancy. Chango.	DNA
Compositae	*Crassocephalum vitellinum* (Benth.) S.Moore	Uwenge (Sh)	New born	Literature
Convolvulaceae	*Ipomoea sp.*	Matembele (Sw)	Anaemia	Herbarium/Literature
Convolvulaceae	*Ipomoea batatas* (L.) Lam.	Sweet potato (En)	Anaemia. Milk production	Literature

Convolvulaceae	*Ipomoea* sp.	Ndelema (Sw)	Diarrhoea	DNA
Crassulaceae	*Kalanchoe* sp.	Kakugwa (Hy)	Milk production. Constipation	DNA/Herbarium
Cucurbitaceae	*Cucurbita pepo* L.	Kikonyo cha boga (Sw)	Prevent pregnancy	DNA
Cucurbitaceae	*Telfairia pedata* (Sm.) Hook.	Kweme (Sw)	New born. Enemas. Right before childbirth. Right after childbirth	Literature
Cucurbitaceae		Akabindizi (Hy)	Sepsis rupture	Herbarium
Cupressaceae	*Cupressus* sp.	Mchomgoma (Sh)	Strengthen child	Informant
Ebenaceae	*Dipspyros* sp.	Mgoto (Zg)	Right after giving childbirth.	Herbarium
Ebenaceae	*Diospyros zombensis* (B.L.Burtt) F.White	Kasela (Kw)	Sickle cell anaemia.	Literature
Ebenaceae	*Euclea natalensis* A.DC.	Mdala (Zg)	?	Herbarium/Literature
Euphorbiaceae	*Euphorbia systyloides* Pax	Kikwazi / Embaki (Hy)	Infertility	Herbarium
Euphorbiaceae	*Manihot esculenta* Crantz	Muhogombichi (Sw)	Milk production	Literature
Euphorbiaceae	*Manihot esculenta* Crantz	Kisamvu (Sw)	Abortion	Literature
Euphorbiaceae	*Manihot esculenta* Crantz	Cassava (En)	Abortion. Milk production	Literature
Euphorbiaceae	*Acalypha ornata* Hochst. ex A.Rich.	Mfulwe (Sw)	Female circumcision	Literature
Euphorbiaceae	*Croton polytrichus* Pax.	Mlawa (Sh)	Anaemia	Literature
Euphorbiaceae	*Spirostachys africana* Sond.	Mkulo (Sh)	Hypertension	Literature
Euphorbiaceae	*Spirostachys africana* Sond.	Muharaka (Kw)	Prevent pregnancy	Literature
Euphorbiaceae	*Spirostachys africana* Sond.	Muharaka (Zg)	Prevent pregnancy	Literature
Euphorbiaceae	*Spirostachys africana* Sond.	Muhalaka (Sw)	Strengthen child	Literature
Euphorbiaceae		Habati Mulki (Ar)	Diarrhoea	Literature
Euphorbiaceae		Batimuruki (Ar)	Haemorrhage/Miscarriage	Literature
Euphorbiaceae	*Ricinus communis* L.	Nyonyo (Sw)	Prevent pregnancy	Literature
Euphorbiaceae	*Ricinus communis* L.	Nyonyo (Sw)	Enemas. Prevent pregnancy. Just before childbirth	Herbarium/Literature
Euphorbiaceae	*Suregada zanzibariensis* Baill.	Mdimpori (Sw)	Free-listing. Protection. Children's fever/malaria	DNA/Literature
Euphorbiaceae	*Suregada zanzibariensis* Baill.	Mdimupori (Sw)	Children's fever/malaria. Convulsions. Free-listing. Protection.	Literature
Euphorbiaceae	*Suregada zanzibariensis* Baill.	Mdimupori (Sw)	Protection	Herbarium/Literature
Euphorbiaceae	*Fragia* sp.	Nzitoima (Hy)	Haemorrhage/Miscarriage	Herbarium

Fabaceae	*Hymenaea verrucosa* Gaertn.	Olbukoi (Ms)	Hypertension. STDs. Right after childbirth. Sepsis rupture. Haemorrhage	Literature
Fabaceae	*Hymenaea verrucosa* Gaertn.	Mkumbi (Sw)	Pregnancy	Literature
Fabaceae	*Hymenaea verrucosa* Gaertn.	Mkumbi (Sw)	Milk production	Literature
Fabaceae	*Delonix elata* (L.) Gamble	Msemelele (Kw)	Pregnancy	Literature
Fabaceae	*Dalbergia melanoxylon* Guill. & Perr.	Mpingo (Sw)	Infertility	Herbarium/Literature
Fabaceae	*Tamarindus indica L.*	Mkwaju (Sw)	Children's respiratory problems	Literature
Fabaceae	*Tamarindus indica L.*	Ukwaju (Sw)	Hiccups	Informant
Fabaceae	*Chamaecrista* sp.	Omfagio (Hy)	Menstruation	Herbarium
Fabaceae	*Albizia* sp.	Mwiganjula (Hy)	STDs. Developing babies	Herbarium
Fabaceae	*Albizia anthelmintica* Brongn.	Olmukutan (Ms)	HIV/AIDS. Pregnancy. Abortion	Literature
Fabaceae	*Albizia anthelmintica* Brongn.	Mfuleta (Kw)	Enemas	Literature
Fabaceae	*Albizia anthelmintica* Brongn.	Mfuleta (Zg)	Enemas	Literature
Fabaceae		Mihande (Kw)	Free-listing. Infertility.	DNA/Herbarium
Fabaceae	*Indigofera* sp.	Tangawila (Hy) / Nyabashumbi (Hy)	Children's fever/malaria	DNA
Fabaceae		Mchingo (Zg)	Children's Stomach ache	Herbarium
Fabaceae	*Acacia* sp.	Kiloriti (Ms)	HIV/AIDS	Literature
Fabaceae	*Acacia* sp.	Mkongowe (Sw)	Infertility	Herbarium/Literature
Fabaceae	*Acacia* sp.	Kiloriti (Ms)	Vaginal cleaning	Literature
Fabaceae	*Acacia* sp.	Kiloriti (Ms)	Free-listing. Hypertension. Menstruation. Pregnancy. Pregnancy (woman)	Literature
Fabaceae	*Acacia* sp.	Mkongowe (Kw)	Child Convulsions. Skinny/sickly children	Herbarium/Literature
Fabaceae	*Acacia nilotica* (L.) Delile	Mkongowe (Sw)	Infertility	Literature
Fabaceae	*Trigonella foenum-graecum* L.	Uwatu (Sw)	After childbirth. Milk production.	Informant
Fabaceae	*Abrus pulchellus subsp. mollis (Hance) Verdc.*	Ongongwenji (Ms)	Umbilical cord	DNA
Fabaceae	*Abrus* sp.	Ufjambo (Sw) / Rufambo (Kw)	Pregnancy. Just before childbirth. Sepsis rupture.	DNA/Herbarium
Fabaceae	*Abrus* sp.	Swipo (Sw) / Mswipo (Dr)	Strengthen child. Bathing. Children's respiratory problems	Herbarium
Fabaceae	*Abrus* sp.	Lufambo (Pv people, 5 tribes)	Hiccups	Informant
Fabaceae	*Abrus* sp.	Ufjambo (Sw)	Children's respiratory problems	DNA/Herbarium

Fabaceae	*Senna* sp.	Salamaki (Ar)	Children's constipation. STDs.	DNA
Fabaceae	*Senna alexandrina* Mill.	Salamaki (Ar)	Enemas	DNA
Fabaceae	*Senna* sp.	Mwinu (Sh)	Enemas	DNA/Literature
Fabaceae	*Senna occidentalis* (L.) Link	Mkundekunde (Sw)	Free-listing	DNA/Herbarium
Fabaceae	*Senna* sp.	Myokayoka (Commercial name)	Menstruation	Herbarium
Fabaceae	*Cassia abbreviata* Oliv.	Mkundekunde (Sw)	Anaemia. HIV/AIDS. Abortion	Literature
Fabaceae	*Cassia abbreviata* Oliv.	Mlundalunda (Sw)	Free-listing. Menstruation.	Literature
Fabaceae	*Cassia abbreviata* Oliv.	Mlundalunda (Nw)	Free-listing. Menstruation	Literature
Fabaceae	*Cassia abbreviata Oliv.*	Mkundekunde (Sw)	HIV/AIDS	Literature
Fabaceae	*Cassia abbreviata Oliv.*	Olsingwai (Ms)	Free-listing. Infertility. Haemorrhage	Literature
Fabaceae	*Glycyrrhiza glabra* L.	Shoshana (Sw)	Children's respiratory problems	Informant
Fabaceae	*Arachis hypogaea* L.	Karanga (Sw)	Skinny/sickly children	Informant
Fabaceae	*Dalbergia melanoxylon* Guill. & Perr.	Kibamilo (Zg)	STDs	Literature/Informant
Fabaceae	*Dichrostachys cinerea (L.) Wight & Arn.*	Mpangapanga (Zg)	Just before childbirth	DNA/Herbarium
Fabaceae	*Cajanus cajan* (L.) Millsp.	Mbaazi (Sw)	New born. Convulsions. Hiccups	Herbarium/Literature
Fabaceae	*Dalbergia melanoxylon* Guill. & Perr.	Mpingo (Sw)	Umbilical cord	Herbarium/Literature
Fabaceae	*Tephrosia villosa* (L.) Pers.	Kizagati (Zg)	Raising women's sexual lust.	DNA/Herbarium
Lamiaceae	*Vitex* sp.	Mgobe / Mfuru (Zg)	Hypertension	Herbarium/Literature
Lamiaceae	*Plectranthus* sp.	Vuga (Sw)	Chango	Herbarium/Literature
Lamiaceae	*Plectranthus Barbatus* Andrews	Mzugwa/Mzugoa (Sh/Sw)	Children's fever/malaria	Herbarium/Literature
Lamiaceae	*Prectranthus*sp.	Mzugwa (Sh/Sw)	3 plants for children	DNA/Herbarium
Lamiaceae	*Ocimum* sp.	Mzumbasha (Zg)	New born. Hiccups.	Herbarium
Lamiaceae	*Ocimum* sp.	Kivumbasi (Sw)	Bathing. Convulsions	Herbarium/Literature
Lamiaceae	*Ocimum* sp.	Mvumbasi (Hy/Sw)	HIV/AIDS	Herbarium/Literature
Lamiaceae	*Ocimum* sp.	Kivumbasi (Sw)	Milk production. Female circumcision. Enemas	Literature
Lamiaceae (Labiatae)	*Hoslundia opposita* Vahl.	Mshwele (Sh)	Free-listing	Literature
Lamiaceae	*Plectranthus* sp.	Mkonowankanda (Hy)	Sepsis rupture	Herbarium

Lamiaceae		Mgonampiri (Hy)	Infertility. Right after childbirth	Herbarium
Lamiaceae		Kashuagala (Hy)	Vaginal cleaning. Pregnancy. Children's Diarrhoea.	Herbarium
Lamiaceae		Mkodingo (Nw)	Vaginal cleaning	Literature
Lauraceae	*Persea americana* Mill.	Avocado (En)	Anaemia. Hypertension	Literature
Lauraceae	*Cassytha filiformis* L.	Mlangamea (Sw)	Childbirth	Herbarium/Literature
Lauraceae	*Cassytha filiformis* L.	Mtotokanga (Zg) / Mlangamia (Sw)	Right before childbirth	Herbarium/Literature
Lauraceae	*Cinnamomum* sp.	Mdalasini (Sw)	Milk production	Literature
Linaceae	*Hugonia castaneifolia* Engl.	Kindukuli (Kw)	Abortion	Literature
Linaceae	*Hugonia arborescens* Mildbr.	Nyambu (Zg)	Haemorrhage. Sepsis rupture. childbirth. Menstruation. Vaginal cleaning	Literature
Loganiaceae	*Strychnos spinosa* Lam.	Mtonga (Sw)	Children's respiratory problems	Literature
Lythraceae	*Punica granatum* L.	Komamanga (Sw)	Diarrhoea	Literature
Malvaceae	*Corchorus aestuans* L./*Grewla* sp.	Mkole (Kw)	Right before childbirth	DNA/Literature
Malvaceae	*Hibiscus sabdariffa* L.	Damdam (Sw)	Anaemia	DNA/Literature
Malvaceae	*Plectranthus*	Kigela (Hy)	Children's fever/malaria	Herbarium
Malvaceae	*Triumfetta* sp.	Molve (Zg)	Children's hiccups	Herbarium
Malvaceae	*Grewia* sp.	Mkongodeka (Sw)	Menstruation	Herbarium/Literature
Malvaceae	*Hibiscus sabdariffa* L.	Rozela (Sw)	Anaemia. Pregnancy. Haemorrhage/Miscarriage	Literature
Malvaceae (Sterculiaceae)	*Dombeya* sp.	Mkirika (Sw)	Pregnancy	Herbarium/Literature
Malvaceae	*Dombeya rotundifolia* (Hochst.) Planch.	Mjata (Zg)	Free-listing. Pregnancy	DNA/Herbarium/Literature
Malvaceae	*Dombeya rotundifolia* (Hochst.) Planch.	Mjata (Zg)	3 plants for women	Literature
Malvaceae	*Dombeya rotundifolia* (Hochst.) Planch.	Mjata (Zg)	Free-listing. Pregnancy (only for the woman)	Literature
Menispermaceae	*Tinospora* sp.	Lutungatunga (Kw, Sw)	Milk production	DNA/Herbarium
Melastomataceae		Kyonyo (Hy)	Menstruation. Stomach ache. Infertility	Herbarium
Meliaceae	*Azadirachta indica* A.Juss.	Mwarobaini (Sw)	HIV/AIDS. Abortion	Literature
Meliaceae	*Azadirachta indica* A.Juss.	Mwarobaini (Sw)	HIV/AIDS. Abortion	Literature
Meliaceae	*Azadirachta indica* A.Juss.	Mwarobaini (Sw)	Developing babies. Children's fever/malaria. Abortion. Enemas. HIV/AIDS. Menstruation	Herbarium/Literature
Moraceae	*Ficus sycomorus* L.	Mkunju (Kw)	New born. Infertility	DNA/Herbarium/Literature

Moraceae	*Ficus* sp.	Mkuyu (Sw)	Hypertension	Literature
Moringaceae	*Moringa oleifera* Lam.	Mlongelonge (Sw)	Milk production. Enemas	DNA/Herbarium
Musaceae	*Musa acuminata* Colla	Mkonawa tembo (Sw)	Umbilical cord	Informant
Musaceae	*Musa acuminata* Colla	Banana (En)	Vaginal cleaning. Right after childbirth	Informant
Myrsinaceae	*Rapanea melanophloeos* (L.) Mez	Mpaja (Sw)	Abortion	Literature
Myrsinaceae	*Rapanea melanophloeos* (L.) Mez	Mpaja (Sw)	Just before childbirth	Literature
Myrtaceae	*Syzygium cumini* (L.) Skeels	Zambarao (Sw)	Anaemia	Informant
Myrtaceae	*Eucalyptus* sp.	Mkalatusi (Sw)	Hiccups	Informant
Myrtaceae	*Syzygium aromaticum* (L.) Merr. & L.M.Perry	Karafu (Sw)	Hiccups	Informant
Myrtaceae	*Psidium guajava* L.	Mpera (Sw)	Diarrhoea	Herbarium/Literature
Myrtaceae	*Psidium guajava* L.	Lasera (Ms)	Diarrhoea	Informant
Myrtaceae	*Psidium guajava* L.	Mpera (Sw)	Diarrhoea. Children's fever/malaria	DNA/Herbarium/Literature
Olacaceae	*Ximenia americana* L.	Mtundwi (Zg)	Free-listing. Developing babies	Literature
Olacaceae	*Ximenia* sp.	Mpingi (Sw)	Free-listing. Female circumcision. Menstruation. Infertility. Pregnancy. Pregnancy (woman). childbirth	Literature
Olacaceae	*Ximenia* sp.	Mpingi (Sw)	Free-listing. Right after childbirth.	Literature
Olacaceae	*Ximenia* sp.	Ngomai (Ms)	Free-listing	Literature
Olacaceae	*Ximenia* sp.	Engamai (Ms)	Free-listing. Infertility.	Literature
Polygonaceae	*Oxygonum sinuatum* (Hochst. & Steud ex Meisn.) Dammer	Enyawaijo (Hy)	Just before childbirth	Herbarium
Phyllanthaceae	*Flueggea virosa* (Roxb. ex Willd.) Royle	Mkwamba (Sw)	Women's chango	DNA/Herbarium
Phyllanthaceae	*Phyllanthus* sp.	Mlangamia (Dr) / Mlangamea (Sw)	Bathing	DNA/Herbarium
Poaceae	*Eleusine indica* (L.) Gaertn.	Kidilo (Sh)	?	Herbarium
Poaceae	*Zea mays* L.	Mais (En)	Haemorrhage/Miscarriage	Informant
Poaceae	*Saccharum officinarum* L.	Miwa (Sw)	Children's respiratory problems	Literature
Poaceae	*Triticum* spp.	Wheat (En)	Diarrhoea	Informant
Poaceae		Ulezi (Sw)	Skinny/sickly children	Informant
Polygalaceae	*Securidaca* sp.	Msigi (Zg)	STDs	Literature

Primulaceae	*Myrsine africana L.*	Original ya chenga (Commercial name)	Infertility	DNA
Rosaceae	*Prunus dulcis* (Miller) D. A. Webb	Tindarosi	Milk production	Informant
Rubiaceae	*Coffea arabica* L.	Coffee-leaves (En)	Diarrhoea	Informant
Rubiaceae	*Agathisanthemum bojeri* Klotzsch	Mwekambi (Zg/Sw)	Right after giving childbirth	Herbarium
Rubiaceae	*Agathisanthemum* sp.	Kwazi / Embaki (Hy)	Infertility	Herbarium
Rubiaceae	*Agathisanthemum* sp.	Mkatakesi (Sw)	Protection. Will make you win in court. People will believe you	DNA/Herbarium
Rubiaceae	*Keetia venosa* (Oliv.) Bridson	Mkandachuma (Sw)	Haemorrhage. Sepsis rupture. Menstruation	Literature
Rubiaceae	*Keetia venosa* (Oliv.) Bridson	Mkandachuma (Sw)	To reduce your menstrual flow	Literature
Rubiaceae	*Keetia venosa* (Oliv.) Bridson	Mkandachuma (Sw)	MP. Sepsis rupture. Haemorrhage	Literature
Rutaceae	*Citrus limon* (L.) Osbeck	Limao (Sw)	Hypertension. Pregnancy	Literature
Rutaceae	*Clausena anisata* (Willd.) Hook.f. ex Benth.	Mkomavikali (Sw)	Female circumcision	Literature
Rutaceae		Ndaneshekue (Ms)	Infertility	DNA
Rutaceae	*Zanthoxylum chalybeum* Engl.	Oloisuki (Ms)	Developing babies. New born children. Children's fever/malaria. Children's respiratory problems. Childbirth. Foetal fluid swallowed by the child	DNA/Literature
Rutaceae		Kan'g (Commercial name)	Pregnancy	DNA
Rutaceae	*Zanthoxylum chalybeum* Engl.	Oloisuki (Ms)	Free-listing. Vaginal cleaning. STDs. Right after childbirth	Literature
Rutaceae	*Zanthoxylum* sp.	Mjafari (Sw)	Free-listing. Developing babies. Haemorrhage/Miscarriage	Herbarium/Literature
Rutaceae	*Zanthoxylum chalybeum* Engl.	Mlungulungu (Nw)	Free-listing	Literature
Rutaceae	*Zanthoxylum* sp.	Mjafari (Sw)	Anaemia. Hypertension. Enemas. STDs. Female circumcision. Right after childbirth. Sepsis rupture	Literature
Rutaceae	*Zanthoxylum* sp.	Mwale (Zg)	Vaginal cleaning. Pregnancy	Literature
Rutaceae	*Zanthoxylum* sp.	Mjafari (Sw)	Right after childbirth.	Literature
Rutaceae	*Zanthoxylum* sp.	Mwale (Kw)	Hypertension	Literature
Sapindaceae	*Zanha africana* (Radlk.) Exell	Mdaula (Sw)	Hiccups	Literature
Sapindaceae	*Zanha africana* (Radlk.) Exell	Mdaula (Sw)	Free-listing. STDs. HIV/AIDS.	Literature
Sapindaceae	*Allophylus* sp.	Nankilika (Sw)	Protection	DNA
Sapindaceae	*Allophylus cobbe* (L.) Raeusch.	Mgufa (Sh)	Children's fever/malaria	DNA

Sapindaceae	*Deinbollia* sp.	Mbwakabwaka (Sw)/ Moyomoyo (Sw)	Hernia	Herbarium/Literature
Sapindaceae		Moyomoyo (Kw)	Hypertension	Literature
Sapotaceae	*Manilkara/Mimusops* sp.	Nsekela (Kw)	Free-listing.	DNA/Herbarium
Solanaceae	*Solanum* sp.	Ndulere (Sw)	Ear problems. Stomach problems	Herbarium
Solanaceae	*Solanum* sp.	Mtulatula (Sw)	Free-listing	Herbarium
Solanaceae	*Solanum sp.*	Mtulatula (Sw)	Free-listing. New born children	Herbarium
Solanaceae	*Solanum lycopersicum* L.	Tomato (En)	Enemas	Informant
Stericuliaceae	*Sterculia appendiculata* K. Schum.	Mgude (Kw)	New born. Umbilical cord. Strengthen child. Bathing. Protection	Literature
Scrophulariaceae		Mshalila (Hy)	New born	Herbarium
Talinaceae	*Talinum portulacifolium* (Forssk.) Asch. ex Schweinf.	Tele (Kw)	Milk production	Herbarium
Talinaceae	*Talinum portulacifolium* (Forssk.) Asch. ex Schweinf.	Kolobwe (Zg)	Women's chango	Herbarium
Theaceae	*Camellia sinensis* (L.) Kuntze	Mtiwa chai (Sw)	Abortion	
Vitaceae	*Cissus quadrangularis* L.	Kihindihindi (Kw)	Milk production	Literature
Vitaceae		Mtamba / Mtombe (Sh)	Anti-conception	Literature
Vitaceae	*Cissus* sp.	?	Flew. Ear and nose-problems	Herbarium
Vitaceae	*Cissus* sp.	Mposa (Sw)	Free-listing	Herbarium
Vitaceae	*Cyphostemma* sp.	Mwengele (Zg/Sw)	Anaemia. Vaginal cleaning. Infertility. Pregnancy	DNA/Herbarium/Literature
Zingiberaceae	*Zingiber officinale* Roscoe	Tangawizi (Sw)	Convulsions. Children's respiratory problems	Informant
Zingiberaceae	*Elettaria* sp. / *Amomum* sp.	Ilili (Sw)	Hiccups	Informant
		Akakira	Pregnancy	
		Akiperelekema (Ms)	Right after childbirth. Milk production	
		Akirakara	HIV/AIDS. Pregnancy.	
		Alalayi (Ms)	Menstruation	
		Alkisus / Alkysusi (Sw)	Children's respiratory problems	
		Boresa / Kidjiba (Pg)	Constipation	
		Budzubudzu (Pg)	Free-listing. New born. Umbilical cord	
		Chamilongera (Ms)	Skinny/sickly children	

	Chapurko (Ms)	Infertility
	Chasange (Ms)	Pregnancy
	Chiganyika (Kw)	STDs
	Dalan gela (Ms)	Umbilical cord
	Ebsokiyo (Ms)	Anaemia
	Eidara (Ms)	Vaginal cleaning
	Elimigomi (Ms)	Strengthen child
	Embarika (Ms)	Vaginal cleaning
	Emsikyoi (Ms)	Infertility
	Engaje meno (Ms)	Hypertension
	Enjane murkel / Enjanimurkeli (Ms)	Milk production
	Erikipere lakema (Ms)	New born
	Ermilorai (Ms)	Male circumcision
	Esideti (Ms)	Haemorrhage/Miscarriage
	Eza (Sh)	Free-listing
	Gilai (Ms)	Male circumcision
	Gilemasuguru (Kw)	Female circumcision
	Goldigomi (Ms)	Free-listing. Anaemia.
	Gole (Kw)	Menstruation
	Gole (Zg)	HIV/AIDS
	Habat Lmulk (Ar)	Hypertension
	Habat Muluki (Ar)	Constipation
	Habat rishadi (Ar)	Diarrhoea
	Habat Sufa (Ar)	Children's respiratory problems. Right after childbirth. Hypertension
	Habati sauda (Ar)	Pregnancy
	Halimiti/ Hartiti / Harititi (Ar)	Children's respiratory problems
	Hara fumait (Ar)	Pregnancy
	Hardali (Ar)	Handicapped children

	Harititi / Altiti (Ar)	Free-listing. Convulsions
	Hegea (Sw)	Anaemia
	Irimigoni (Ms)	Skinny/sickly children
	Jeninaro (Ms)	Umbilical cord
	Jumbo	Bathing children
	Kadonge (Commercial name)	Free-listing. Fungus.
	Kakomo (Hy)	Strengthen child
	Kalibikantu (Pg)	Convulsions
	Kalipekantu (Pg)	New born. Convulsions
	Kalundekangwale (Pg)	New born. Convulsions
	Kanjoro (Hy)	New born
	Karafuumait (Sw)	Protection. Convulsions
	Karamata (Hy)	Worms
	Kashire	Vaginal cleaning.
	Kausha (Kw)	Female circumcision
	Kiazipori (Sw)	Anaemia
	Kigolagembe (Kw)	Infertility
	Kijiba (Boresa Natural Oil (Commercial name))	Constipation
	Kikula gembe (Sw)	Children's respiratory problems
	Kilundekanwale	Children's fever/malaria
	Kindukuli (Kw)	STDs
	Kishura (Hy)	Bathing children
	Kisk(h)enda (Hy)	Vaginal cleaning
	Kitaterante (Hy)	Degedege
	Kiviza (Commercial name)	Vaginal cleaning
	Kizabuni (Sw)	Umbilical cord. Diarrhoea
	Kodongo (Zg)	Haemorrhage/Miscarriage

	Kulo (Zg)	Haemorrhage. Vaginal cleaning
	Kungumanga (Nw)	Menstruation
	Kwindilekwima (Zg)	Infertility
	Kwindilekwime (Zg)	Infertility
	Lesilwai (Ms)	Children's respiratory problems
	Linyunyu (Pg)	Free-listing. Children's fever/malaria
	Lodwa (Ms)	Hypertension
	Lolondo (Sh)	Bathing children
	Loponi (Ms)	Male circumcision
	Lupande (Ms)	Developing babies. Umbilical cord. New born. Constipation. Skinny/sickly children
	Luvumbampuku (Zg)	Bathing children
	Machungwanga (Ms)	Convulsions
	Madafu (Sw)	HIV/AIDS
	Mafumba (Kb)	Constipation
	Magongori (Ms)	Anaemia
	Maharagepori (Sw)	Umbilical cord
	Majani Mlumila (Pg)	Enemas
	Malulu (Bena)	New born
	Manjano (Sw)	Female circumcision. Sepsis rupture. Right after childbirth
	Manyazi (Sw)	Haemorrhage/Miscarriage
	Matchungwa (Ms)	Convulsions
	Matumbwe (Ms)	Anaemia
	Mavi ya songura (Sw)	Strengthen child
	Mavimavi (Sw)	Convulsions
	Mbasu (Kw)	Infertility. Right before childbirth
	Mbawa (Sh)	Strengthen child. Children's respiratory problems
	Mbilimbi (Sw)	Diarrhoea

	Mblavlaganje (Kw)	Right after childbirth
	Mboloana	Strengthen child
	Mbuyu (Sw)	Pregnancy (child)
	Mchaichai (Sw)	Hypertension. Abortion
	Mchalazi (Hy)	STDs
	Mchanuot	Strengthen child
	Mchetegyni (Sw)	Diarrhoea
	Mchicha (Sw)	Anaemia
	Mchupwa (Sh)	Stomach ache
	Mdaa (Sw)	Diarrhoea
	Mdalu (Nw)	STDs
	Mdoke (Nw)	Haemorrhage/Miscarriage
	Mdomilo (Nw)	HIV/AIDS
	Mdongonyeze (Sh)	Free-listing
	Mehicha (Nw)	Milk production
	Melida (Sw)	Vaginal clean
	Mfagio (Sw)	Strengthen child
	Mfaraja (Kw)	Developing babies
	Mfuje (Sw)	New born. Enemas
	Mfulafula (Kw)	Sepsis rupture
	Mfulu (Sw)	Hypertension
	Mfumbili (Kw)	Right before childbirth
	Mfumbili (Sw/Zg/Sh)	Dysentery
	Mfunguo (Sw)	Just before childbirth
	Mfunguo (Sw)	Just before childbirth. Vaginal cleaning
	Mfungwaliza (Zg)	Protection
	Mfungwaliza (Zg)	Women's chango
	Mfyambo (Sw)	Convulsions
	Mgoeko	Vaginal cleaning

	Mgongo (Sw)	Just before childbirth
	Mgongo (Zg)	For asthma
	Mguluka (Sw)	Convulsions
	Mguluka (Sw)	Bathing children
	Mhegea (Kw)	Free-listing
	Mikunde (Sw)	Protection
	Mjambo	Free-listing
	Mjembajemba (Dr)	Strengthen child
	Mkakonde (Kw)	Strengthen child
	Mkalala (Nw)	Anaemia
	Mkambakamba	Diarrhoea
	Mkanya (Hy)	Bathing children
	Mkomamonga (Sw)	Diarrhoea
	Mkomingi (Sw)	Child Convulsions
	Mkongodeka (Sw)	Convulsions
	Mkonze (Nw)	Infertility
	Mkunju (Kw)	Infertility
	Mkunju (Kw)	Infertility. After childbirth.
	Mkunungu (Zg)	?
	Mkuuni (Nw)	HIV/AIDS
	Mkwizingi (Zg)	HIV/AIDS
	Mlabuliko (Hy)	Free-listing
	Mlavlaganje (Kw/Sw)	Haemorrhage/Miscarriage
	Mleambwimba (Sw)	Developing babies
	Mlenga (Kw)	Right before childbirth
	Mlondelonde (Kw)	Strengthen child
	Mlondo (Kw)	Position
	Mlonge (Nw)	Hypertension. Enemas. Milk production
	Mmumbu (Zg)	Hypertension

	Mnama (Sh)	Protection
	Mnaziguahazi (Nw)	Free-listing. Menstruation
	Mnefu (Commercial name)	HIV/AIDS
	Mninga (Sw)	?
	Mnyabuliko (Hy)	Children's respiratory problems
	Mnyinya (Commercial name)	STDs
	Mnyunyu (Sw)	Diarrhoea. Constipation
	Mohongo (Kw)	Free-listing. Menstruation. Sepsis rupture
	Moka (Sh)	Free-listing
	Molwe (Zg)	Free-listing. Developing babies. New born. Hiccups
	Mongoso	Protection
	Mpatju (Sw)	Before childbirth
	Mpigi (Ms)	Convulsions
	Mpitahamwe (Zg)	Prevent pregnancy
	Msada (Nw)	Infertility. Vaginal cleaning. STDs
	Msadala (Nw)	Vaginal cleaning
	Msalansi (Nw)	Right after childbirth
	Msasampeke (Mh)	Free-listing. MP
	Msegene (Nw)	Vaginal cleaning
	Mshasha (Sh)	Convulsions
	Mshelene (Nw)	Pregnancy. Right after childbirth
	Msiga (Kw)	Umbilical cord
	Msinganyika (Kw)	STDs
	Msolo (Sw)	Enemas
	Msonobari (Sw)	STDs
	Msosoana (Kw)	Female circumcision. Sepsis rupture.
	Msukisuki (Sw)	Strengthen child. Convulsions
	Mtabataba/Silicon (Commercial name)	Hypertension

	Mtama (Sw)	Children's respiratory problems
	Mtamba (Sw)	Developing babies
	Mtamba (Sw)	Developing babies
	Mtogo (Zg)	STDs
	Mtokwe (Zg)	New born
	Mtomokwe (Zg)	Raising the husband's sexual lust.
	Mtomokwe (Zg)	Raising the husband's sexual lust.
	Mtowo (Nw)	Infertility
	Mtutukanga (Sw)	New born
	Muaha (Sh)	Convulsions
	Muhoma (Kw)	Free-listing
	Muhomboa (Sh)	Children's respiratory problems
	Muhumba (Zg)	HIV/AIDS
	Muhungulu (Zg)	Infertility
	Mukembeti	Free-listing
	Mukusi (Ms)	Diarrhoea
	Mukutani (Ms)	Enemas
	Mulela	Pregnancy
	Mumbo (Zg)	Sepsis rupture. General wounds. Stroke.
	Mumbu (Zg)	Hypertension
	Mundi (Commercial name)	Free-listing. HIV.
	Muomboa (Sh)	Pregnancy
	Murfu (Zg)	HIV/AIDS
	Muru (In)	Free-listing
	Muruturutu (Sw)	Male circumcision
	Muyembayemba (Sw)	Strengthen child
	Mwagata (Kw)	Pregnancy
	Mwangayini (Kw)	Milk production

	Mwashawasha (Sw)	Milk production
	Mwegea (Sw)	Sickle cell anaemia. Anaemia.
	Mwingajini (Sw) / Kibange (Zg)	Free-listing
	Mwingile (Sw)	Free-listing
	Mwingiro (Kw)	Sepsis rupture
	Mwinula (Zg)	Children's fever/malaria
	Mwombe (Kw)	Pregnancy
	Mvuje / Mwuje (Sw)	Protection. Convulsions
	Mvulavula (Zg)	Milk production
	Mwutadam	Anaemia
	Mwyeo	Right after childbirth
	Myofyo (Sh)	Menstruation
	Myonza (Hy)	Free-listing.
	Mzono (Sh)	Bathing children
	Mzozoana (Kw)	Pregnancy
	Mzuo (Sh)	Bathing children
	Nashagamba (Sh)	Free-listing
	Neshengiye (Ms)	Free-listing. Menstruation.
	Ngajaneno (Ms)	Pregnancy
	Ngalenohy (Ms)	Anti-conception
	Ngetwa (Commercial name)	Free-listing. Hypertension. STDS's. MP. Infertility. Fibroids. 120 diseases.
	Ngezi (Ms)	Diarrhoea
	Ngovo (Zg/Sw)	Abortion
	Njekwue (Ms)	Convulsions
	Nkuwa (Nw)	Anaemia
	Notoleja (Ms)	Diarrhoea
	Nourish (Commercial name)	Anaemia
	Nyambu (Zg)	Haemorrhage

	Nyanya chunga (Nw)	Milk production
	Nyanyachungo (Sw)	Milk production
	Nyota (Sw)	Bathing
	Obogoy (Ms)	Bathing
	Olipilikvua (Ms)	Diarrhoea
	Olk(h)oraka (Ms)	Diarrhoea
	Olkonguu (Ms)	Before childbirth.
	Olmapanele (Ms)	Menstruation
	Olmatanga (Ms)	Female circumcision
	Olongwenyi (Ms)	Enemas. Stomach ache. Infertility
	Omgege (Hy)	Free-listing. Protection
	Omomenwi (Ms)	Umbilical cord
	Omoro (Ms)	Developing babies. Male circumcision
	Omoshasha (Hy)	Hypertension
	Omoshasha (Hy)	Hypertension
	Ondemwai (Ms)	Menstruation
	Ongoswa (Ms)	STDs
	Onjasange (Ms)	Anaemia
	Orgelai (Ms)	STDs
	Orgurgui (Ms)	Bathing
	Original (Commercial name)	Infertility
	Ormatanga (Ms)	Enemas. Vaginal cleaning
	Ornagalangala / Ngalangala (Ms)	Anaemia
	Oromoro (Ms)	STDs
	Orpande (Ms)	Anaemia. Hypertension
	Ortapuruko (Ms)	Enemas
	Orumbwi (Ms)	Miscarriage
	Osaidi (Ms)	Pregnancy

	Oyalao (Ms)	Female circumcision
	Pachori (Sw)	Children's fever/malaria
	Pakanga (Sw)	Children's fever/malaria
	Pangaa (Sw) / Ngolokila (Zg)	Pregnancy
	Pilipilimanga (Sw)	Milk production
	Pilipilimtama (Sw)	Milk production
	Posa (Dr)	Strengthen children. Bathing
	Send One (Commercial name)	Pregnancy. Just before childbirth
	Shaubu	Vaginal cleaning
	Seaweed (En)	Handicapped children
	Shiye (Ms)	Convulsions
	Songwa (Pg)	Children's fever/malaria
	Sutweima (Hy)	Worms
	Tambo (Sh)	Skinny/sickly children
	Tambwe (Sh)	Strengthen child. Bathing children. Skinny/sickly children
	Togoto (Sh)	Umbilical cord
	Uchanira lomurani (Ms)	Enemas
	Uk(h)ulwe (Sh)	Free-listing. New born. Convulsions
	Upele (Ms)	Bathing
	Uzafi (Ar)	Developing babies
	Wenge (Sh)	Bathing children
	Wumbasa / Mvumbasa / Uvumbasa (Sh)	Bathing children. Convulsions. Children's fever/malaria
	Zaatari	Hypertension
	Zatiuni (Sw)	Handicapped children
	?	Typhoid

Language abbreviations: Swahili (Sw), Maasai (Ms), Kwere (Kw), Shambaa (Sh), Zigua (Zg), Haya (Hy), Pangwa (Pg), English (En), Dengereko (Dr), Arabic (Ar), Nyamwezi (Nw), Indian (In), Muha (Mh), Kibena (Kb).