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Plants Used by Nyamwezi Traditional Health Practitioners To Remedy Sexually Transmitted Infections in Sikonge, Tanzania

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Abstract

This study aims to document medicinal plants used by Nyamwezi traditional health practitioners (NTHPs) in managing sexually transmitted infections (STIs) in Sikonge District. The data on medicinal plants were collected using a semi-structured questionnaire. A total of 23 NTHPs were interviewed. The findings revealed that 28 medicinal plants, belonging to 16 families and 25 genera, are used for the management of STIs in Sikonge. Most species belonged to family Fabaceae (17.9%), Apocynaceae, Combretaceae and Euphorbiaceae (10.7% each), and Olacaceae and Rutaceae (7.1% each). Out of the recorded plants, 45.7% are used to manage gonorrhoea, 25.7% syphilis, 17.1% vaginal candidiasis, 8.6% HIV/AIDS related infections and 2.9% chlamydia. *Cassia abbreviata* (47.8%), *Ximenia caffra* (39.1%) and *Abrus precatorius* (34.8%) were plants with high citation index. Tree (50.0%) and root (70.9%) were the most utilized growth form and plant part, respectively. 85.7% of the species were collected from the wild. Decoction (73.3%) and oral (86.2%) were the most used methods of preparation and administration of remedies, respectively. These study findings can serve as resource for the probe of bioactive components, which can lead to the discovery of contemporary drugs. Thus, the study recommends for pharmacological investigations of the reported plants, provision of awareness to NTHPs on sustainable harvest and conservation of the plants, and mentorship to the younger generation in an effort to preserve the indigenous knowledge.

Keywords*: ethnomedicine, herbal medicine, sexually transmitted infections, Sikonge, traditional healers*

1. Introduction

Sexually transmitted infections (STIs)—which include gonorrhoea, syphilis, HIV/AIDS, trichomoniasis, chlamydia, herpes simplex virus (HSV-2), human papilloma virus (HPV) and vaginal candidiasis infections—are major public health concerns in Africa, especially in the sub-Saharan Africa (SSA) region. According to World Health Organisation (WHO), over a million people acquire STIs daily; and out of the half billion cases reported annually, 25% are from the SSA region (WHO, 2013). The prevalence of STIs in Tanzania is increasingly becoming a public health problem too. According to Buhalata et al. (2017), the prevalence of all STIs is 55.8%, which is relatively high than in other countries. The consequences of STIs have intense impacts on sexual and reproductive health. Some of the consequences include foetal and neonatal deaths, cervical cancer, and infertility

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(WHO, 2013). At present, the growing drug-resistant strains to the used STI's antimicrobials has consolidated the drive to quest for novel effective and low-cost sources of antimicrobial drugs (Maema et al., 2019).

Several ethnobotanical studies conducted in different African countries (Chinsembu, 2016; Gbadamosi & Egunyomi, 2014; Kamanja et al., 2015; Maema et al., 2019; Maroyi, 2013; Naidoo et al., 2013; Namukobe et al., 2011; Ndubani & Höjer, 1999) have demonstrated that an ample proportion of the population, especially rural inhabitants, rely on plant medications for their primary health care needs on STIs. The similar case is true for Tanzania (Amri & Kisangau, 2012; Augustino & Gillah, 2005; Chhabra et al., 1990a; Chhabra et al., 1990b; Kacholi, 2020; Maregesi et al., 2007; Moshi et al., 2012), whereby almost 72% of the rural population rely on medicinal plants for their medications. The dependence on medicinal plants for many lower- and middle-income countries is linked with the lack of access to modern health facilities, and the inability to pay for modern drugs and health services (Amri & Kisangau, 2012; Maroyi, 2013; Mathibela et al., 2019). For instance, in the study area, only one government hospital is registered; and it is situated in the urban area where only a minority (5.2%) of the district population lives (URT, 2012). This has prompted a great dependence of the rural inhabitants on traditional healers for their primary healthcare needs.

Like is the case with many other tribes in the country, the Nyamwezi indigenous knowledge is controlled by oral tradition, and the majority of the practitioners who have this knowledge are elderly. On the other side, the medicinal uses of plants are rapidly declining among the present generation due to modernization, and the younger generation is showing little interest in ethnomedicine (Ariyo et al., 2020). This means that some vital and basic ethnomedicinal information may be lost, hence, documenting indigenous knowledge is of paramount importance. In Tanzania, several ethnobotanical studies focusing on medicinal plants have been done (Amri & Kisangau, 2012; Augustino & Gillah, 2005; Kacholi, 2020; Kitula, 2007; Moshi et al., 2009, 2012). However, information available on medicinal plants used for the treatment of STIs in Tabora region is scarce. Hence, the present study aimed to document ethnobotanical knowledge (medicinal plants, parts used, ailment treated, as well as preparation and administration methods) held by NTHPs in managing STIs in Sikonge district. The documented information offers an opportunity for conserving the deteriorating knowledge for future pharmacological researches on the medicinal plants.

2. Materials and Methods

2.1 Description of the Study Area

This study was carried out in Sikonge District located in the southern part of Tabora region at latitudes 05°15' to 06°45'S, and longitudes 32°15' to 33°45' E (Figure 1). The district is enclosed by five districts: Uyui to the north, Manyoni of the Singida region to the east, Urambo to the northwest, southwest by Mlele of the Katavi region, and to the south by Chunya of the Mbeya region. The Sikonge district has a total population of 179,883 people, with a growth rate of 3.1% per annum; and a density of 6.84 people per km^2. Of the total population, 94.8% lives in rural areas (URT, 2012) where there is limited contemporary medical facilities. A majority of the people, especially those living in rural areas, rely on agriculture, particularly growing cereals and tobacco crops, for their livelihood. Other socio-economic undertakings include lumbering, honey gathering, livestock keeping and doing petty business (Masanja, 2013).

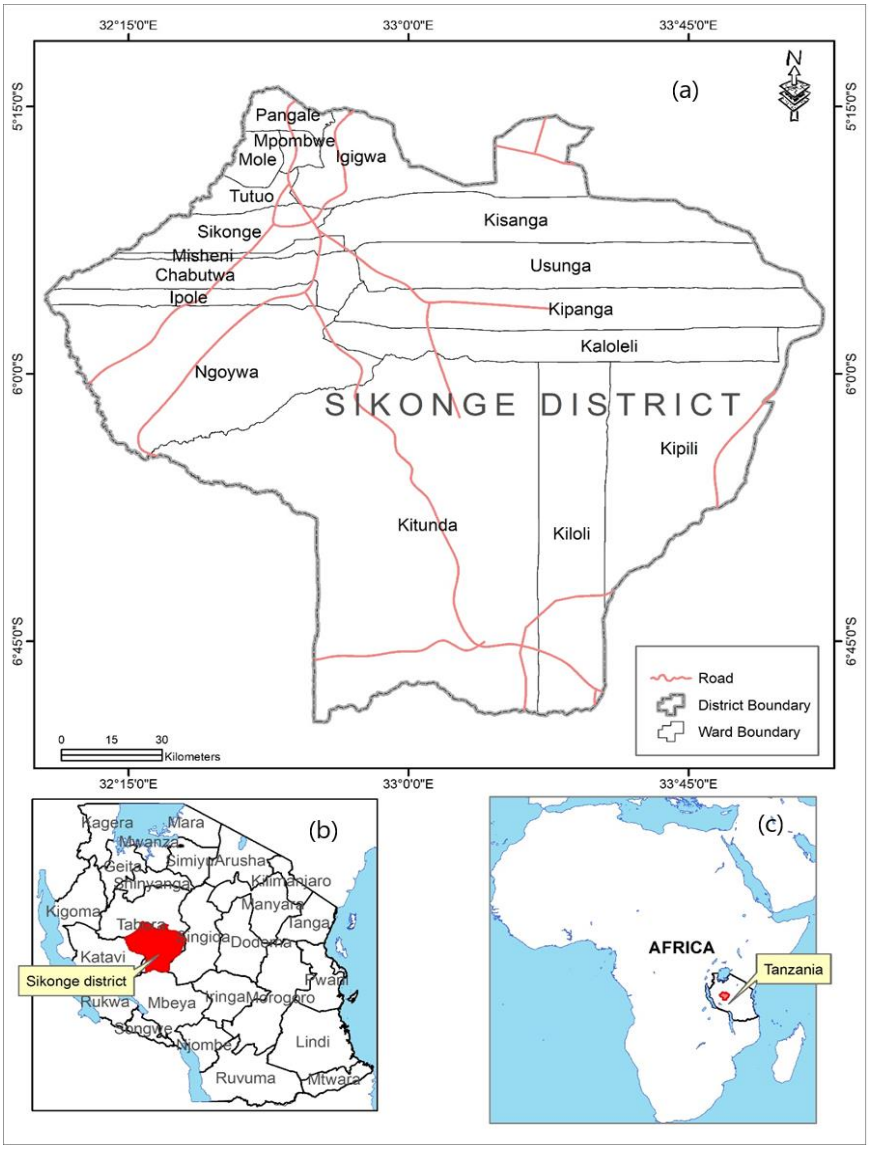


Figure 1: Map of Sikonge District (a) and location of the district in Tanzania (b) and Africa (c).

2.2 Research Clearance and Ethical Consent

The research clearance for the study was obtained from the office of the Vice Chancellor of the University of Dar es Salaam before commencing data collection. Also, before undertaking interviews, the purpose of the study was communicated to the Sikonge District Council, ward/village executive officers, and the NTHPs; who and were also asked for their consent.

2.3 Ethnobotanical Information

The ethnobotanical data were collected between August and October 2020. Snowball sampling was applied during the survey of NTHPs that use medicinal plants to treat STIs in the villages. Key government officials were used to confirm the presence of, and access to, NTHPs in the various parts of the district. Twenty-three (23) NTHPs were ultimately involved in the study after obtaining their consent. Using a semi-structured questionnaire, the NTHPs were individually involved in the interviews on: plants used for curing STIs, part(s) used, source of the plants, and preparation and administration methods. All the interviews were conducted in Kiswahili, and later translated into English. The identification of plants was done in the field by a qualified botanist, except for taxonomically difficult plants that had to be collected and identified later. All scientific names were verified using the International Plant Name Index website (IPNI, 2021).

2.4 Data Analysis

The collected information from the questionnaire was captured in Microsoft Excel, Version 2013, and analysed using descriptive statistics. The percentage citation index (CI) for each species was calculated as per following formula:

$$CI = \frac{N_a}{N_b} \times 100$$

Whereas N_a is the number of NTHPs that cited a plant as an ethnomedicine, and N_b is the total number of interviewed NTHPs.

3. Results and Discussion

3.1 Types of STIs Managed by NTHPs

A total of five (5) STIs were reported to be treated by the NTHPs using plants. These included gonorrhoea, syphilis, chlamydia, vaginal candidiasis, and HIV/AIDS. The NTHPs reported the STIs to be transmitted mainly through sexual intercourse.

3.2 Medicinal Plant Use

A total of 28 medicinal plant species belonging to 16 families and 25 genera were used by NTHPs to manage STIs such as gonorrhoea, syphilis, chlamydia, HIV/AIDS and vaginal candidiasis in Sikonge district. Most of the recorded plants belonged to the family Fabaceae (17.9%), followed by Apocynaceae, Combretaceae and Euphorbiaceae with 10.7% of the species each, and Olacaceae and Rutaceae with 7.1% each. The remaining 10 families had only one species each (Table 1).

Table 1: Medicinal Plants Diversity in Sikonge District

Family	No. of genera	% of genera	No. of species	% of species
Fabaceae	4	16.0	5	17.9
Apocynaceae	3	12.0	3	10.7
Euphorbiaceae	3	12.0	3	10.7
Combretaceae	2	8.0	3	10.7
Rutaceae	2	8.0	2	7.1
Olacaceae	1	4.0	2	7.1
Other10 families	10	40.0	10	35.7

Some of the reported families in this study have been reported elsewhere to be among the important families used for the treatment of STIs. For example, family Fabaceae is reported to be the most important family used by traditional healers in treating STIs in Blouberg area in South Africa (Mathibela et al., 2019), Sesheke district in Zambia (Chinsembu, 2016), and in Guvure district in Zimbabwe (Kambizi & Afolayan, 2001). Combretaceae and Euphorbiaceae were also reported in Namibia (Chinsembu & Hedimbi, 2010) and South Africa (De Wet et al., 2012) to be used for the management of STIs too. These studies have established that the dominance of the above families is due to their wide distribution range and high species richness, hence, being significant plat families in managing STIs in the areas. Moreover, the present study has recorded a big number of medicinal plants used for STIs treatment than those recorded in Kenya (16 species) (Kamanja et al., 2015), and South Africa (17 species) (Mathibela et al., 2019). The possession of a large number of medicinal plants is an indication of the ethnobotanical wealth in Nyamwezi land.

Among the medicinal plant species identified by NTHPs, 45.7% are used for the management of gonorrhoea, 25.7% for syphilis, 17.1% for vaginal candidiasis, 8.6% and 2.9% for HIV/AIDS related infections and chlamydia, respectively (Figure 2). Three species with high citation index were *Cassia abbreviata* (47.8%), *Ximenia caffra* (39.1%) and *Abrus precatorius* (34.8%) (Table 2). The same species were also reported in other settings to be used by traditional healers to manage STIs. For instance, traditional healers in South Africa and Zambia use *C. abbreviata* and *X. caffra* for the management of gonorrhoea and HIV/AIDS opportunistic diseases (Chinsembu, 2016; Chinsembu et al., 2019); while in Kenya, *A. precatorius* is used for the management of gonorrhoea (Kareru et al., 2008). *X. caffra* is also used by Hehe traditional healers in Iringa region for the treatment of gonorrhoea and syphilis (Augustino & Gillah, 2005). Also, *C. abbreviata*, *X. caffra* and *F. obovata* are known to be used by the Luguru people in Morogoro region for the management of gonorrhoea and syphilis (Amri & Kisangau, 2012; Augustino & Gillah, 2005; Chhabra et al., 1990b). The use of these species in various settings suggest that the plants are rich in bioactive ingredients against STIs; thus, further antimicrobial studies are vital. All six species used for the treatment of vaginal candidiasis in this study (Table 2) were also reported to treat candida infections in other regions of Tanzania (Runyoro et al., 2006).

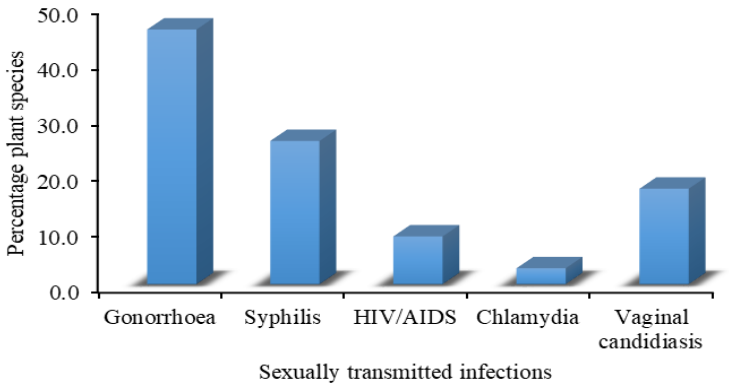


Figure 2: Percentage Used Plant Species per STI type

Table 2: Medicinal Plants Used by NTHP in Sikonge District in Managing STIs

Family	*Scientific name*	Vernacular name	Growth forms	Parts used	Source	CI	Ailment treated	Mode of preparation and administration
Anacardiaceae	*Ozoroa insignis* Del.	Mukalakala	Tree	Bark	Wild	17.4	Vaginal candidiasis	Powdering, mix with tea or warm water and taken orally
Annonaceae	*Friesodielsia obovata* (Benth.) Verdc.	Msalasi	Shrub	Roots	Wild	21.7	Gonorrhoea	Crush fresh roots, infuse in warm water and drink the solution
							Syphilis	Crush fresh roots and apply to affected part
Apocynaceae	*Diplorhynchus condylocarpon* (Müll.Arg.) Pichon	Musongati	Shrub	Roots	Wild	13.0	Gonorrhoea	Decoction and taken orally
	Hollarrhena pubescence Wall. ex G. Don	Musongaluguka	Tree	Roots	Wild	13.0	Syphilis	Decoction and taken orally
	Strophanthus eminii Asch. ex Pax	Musungululu	Shrub	Bark	Wild	21.7	Syphilis	Decoction and taken orally
Caricaceae	*Carica papaya* L.	Mpapai	Tree	Roots	Cultivated	8.7	Gonorrhoea	Decoction and taken orally
Combretaceae	*Combretum molle* R.Br. ex G. Don	Mulama	Tree	Roots	Wild	17.4	Vaginal candidiasis & Gonorrhoea	Powdering and taken orally by mixing with porridge or tea Decoction and taken orally
	Terminalia sericea Burch. ex DC.	Mupululu	Tree	Roots, Bark	Wild	13.0	Gonorrhoea	Powdering, mix with porridge or tea and taken orally
	Terminalia kaiserana F. Hoffm.	Muzima	Tree	Roots	Wild	30.4	Gonorrhoea & Syphilis	Decoction and taken orally
Euphorbiaceae	*Euphorbia grantii* Oliv.	Mudulansongo	Succulent	Roots	Cultivated	13.0	Gonorrhoea	Decoction and taken orally
	Oldfieldia dactylophylla (Welw. ex Oliv.) J.Léonard	Muliwanfywengi	Shrub	Roots	Wild	13.0	Gonorrhoea	Decoction and taken orally
	Phyllanthus engeri Pax	Mng'olong'ondi	Shrub	Roots	Wild	17.4	Syphilis	Decoction and taken orally
Fabaceae	*Abrus precatorius* L.	Muchichi	Herb	Roots	Wild	34.8	Gonorrhoea	Decoction and taken orally
	Cassia abreviata Oliv.	Muzoka	Tree	Roots, Bark	Wild	47.8	Gonorrhoea, Syphilis & chlamydia	Decoction and taken orally
	Cassia singueana Delile (Lock)	Musambila	Tree	Leaves	Wild	13.0	Gonorrhoea	Decoction and taken orally
	Entanda abyssinica A.Rich.	Mfutwamvula	Tree	Roots	Wild	26.1	Gonorrhoea	Decoction and taken orally
	Tamarindus indica L.	Musisi	Tree	Roots	Cultivated	17.4	Vaginal candidiasis	Crush fresh roots and apply on affected part when bathing
Liliaceae	*Asparagus falcatus* (L.) Druce	Kasolanhanga	Climber	Roots	Wild	26.1	Gonorrhoea	Decoction and taken orally

Family	*Scientific name*	Vernacular name	Growth forms	Parts used	Source	CI	Ailment treated	Mode of preparation and administration
Malvaceae	*Adansonia digitata* L.	Mibuyu	Tree	Bark	Wild	13.0	HIV/AIDS	Macerate, infuse in water warm and taken orally
Moringaceae	*Moringa oleifera* Lam.	Mlonge	Tree	Leaves	Cultivated	21.7	Vaginal candidiasis	Crush the fresh leaves, roll them and apply on affected part during bathing
Olacaceae	*Ximenia americana* L.	Mutundwa	Shrub	Roots	Wild	13.0	Gonorrhoea	Decoction and taken orally
	Ximenia caffra Sond.	Munembwa	Shrub	Roots, Leaves	Wild	39.1	Gonorrhoea & Syphilis	Decoction and taken orally
Oleacaceae	*Schrebera trichoclada* Welw.	Muputika	Shrub	Leaves	Wild	17.4	Vaginal candidiasis	Crush fresh leaves, apply on the affected part when bathing
Rhamnaceae	*Ziziphus mucronata Wild.*	Kavogole	Tree	Roots	Wild	13.0	Chlamydia	Decoction and taken orally
Rubiaceae	*Catunaregam spinosa* (Thunb.) Tirveng	Mochangoko	Shrub	Roots	Wild	13.0	Syphilis	Decoction and taken orally
Rutaceae	*Zathoxylum chalybeum* Engl.	Mlundalunda	Tree	Roots	Wild	21.7	Gonorrhoea	Decoction and taken orally
	Harrisonia abyssinica Oliv.	Msomwanjala	Shrub	Roots	Wild	17.4	HIV/AIDS & Vaginal candidiasis	Decoction and taken orally
Verbenaceae	*Clerodendrum myricoides* (Hochst.) R.Br. ex Vatke.	Mupugambu	Shrub	Roots	Wild	30.4	Gonorrhoea & Syphilis	Decoction and taken orally

3.2 Growth Forms Used

The findings revealed trees (50.0%) and shrubs (39.0%) to be the principal growth forms exploited by NTHPs in Sikonge district (Figure 3). The findings are in line with the ethnobotanical survey conducted in Sesheke district, Western Province in Zambia (Chinsembu, 2016), which observed trees (50%) and shrub (31%) to be the dominant growth forms used in treating STIs. In Zimbabwe, trees and shrubs are also described to be the most utilised growth forms in making herbal remedies (Maroyi, 2011). Likewise, in Bugabo ward, Kagera region in Tanzania, Moshi et al. (2009) reported almost analogous findings; whereby trees (31%) and shrubs (26%) dominated the growth forms used as ethnomedicine by the Haya tribe. The use of trees and shrubs by NTHPs in Sikonge district is essentially due their wide range and ease of accessibility throughout the year, hence providing sustainable source of medicinal plants in the management of STIs.

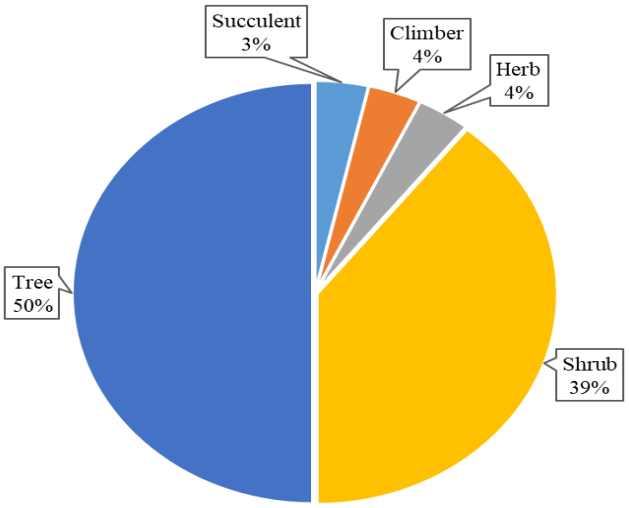


Figure 3: Percentage Use of Growth Forms in Managing STIs in Sikonge

3.3 Plant Parts Used

The most used plant parts by the NTHPs were roots (70.9%), followed by bark (16.1%) and leaves (13.0%) (Figure 4). Similar findings were reported in Limpopo Province in South Africa (Maema et al., 2019; Semenya et al., 2013); and in Dabaga Ulogambi forest in Tanzania (Kitula, 2007). Roots are chiefly favoured as they are believed to possess potential pharmacological compounds (Chinsembu, 2016). But the harvest of roots in a massive amount is known to be destructive and threatens the survival of the plants (Akerele et al., 1991; Cunningham, 2001). The uprooting of the herbs and shrubs has hurtful effects not only to the plant itself but also to the root systems of adjacent plants (Semenya et al., 2013). Moreover, uncontrolled harvest of bark, especially of slow-growing plant species, can result to extinction (Geldenhuys, 2004). Thus, to ensure that the future generation will enjoy what the current one is now enjoying, there is a need to educate NTHPs on sustainable harvesting procedures and conservation of the plants.

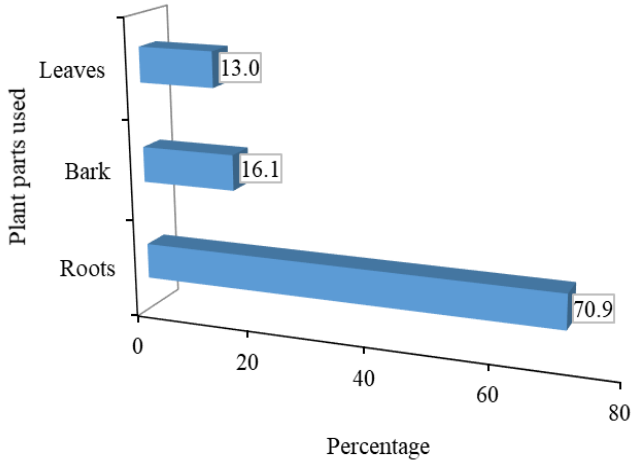


Figure 4: Percentage Use of Plants Parts in Managing STIs in Sikonge District

3.4 Collection and Source of Medicinal Plants

All the interviewed NTHPs acknowledged to collect the plants by themselves. They reported 85.7% of the medicinal plants to be collected from the wild (communal lands, forests and woodlands), while 14.3% were collected from cultivated areas such as agricultural lands and home-gardens (Table 2). The practice of collecting medicinal plants by themselves aims not only to preserve the secrecy of locations, but also to guarantee medicinal efficacy and sexual purity. Normally, the plants should be collected by a person who has had no sexual intercourse for at least a day prior to collection. The same practice has been reported in Samburu district, Kenya (Nanyingi et al., 2008), and Limpopo province, South Africa (Semenya et al., 2013). In very rare situations, and under careful guidance, can an ordinary person or trainee collect medicinal plants on behalf a NTHP. The NTHPs admitted to collect medicinal materials from the wild due to the ease of accessibility. Also, some NTHPs have chosen to grow endangered plant species on their farms or home gardens as one of the conservation measures in ensuring sustainable supply of the remedies. However, this measure can be an unhelpful effort if they conserve the plants in their own lands, but at the same time continue to harvest them in the wild.

3.5 Preparation and Administration of Remedies

The methods of preparing remedies were mostly in the form of decoction (73.3%) and infusion (26.7%) (Table 2). Usually, decoction is primarily done for the purpose of speeding up the extraction of active ingredients from the materials, detoxifying poisonous compounds, and sterilising used materials (Maema et al., 2019); while infusion is mainly for extraction of healing properties (Abubakar & Haque, 2020). Among the prepared medications, 86.2% were administered orally, while 13.8% were topically administered (Table 2). The majority of the medications reported by the NTHPs are administered after a meal (breakfast, lunch, or dinner) for a period of a week, or until the illness subsides. The medications are taken after meal for the purpose of reducing the likelihood of side-effects such as stomach irritation, inflammation, or ulcers.

4. Conclusion

The present study has provided a list of medicinal plants, used parts, ailment cured, mode of preparation, and administration routes used by NTHPs in managing STIs in Sikonge district. Also, it has revealed that aboriginal plants plays a vital role in the Nyamwezi traditional primary healthcare in managing STIs. Therefore, the study recommends the following;

1. Pharmacological investigation of the reported plants to understand drugs properties and their functions, and the formulation of contemporary drugs for the management of STIs;
2. Provision of education to NTHPs on sustainable harvest of plant materials and conservation of the plants at large;
3. NTHPs to be advised/encouraged to mentor the younger generation in an effort to preserve the indigenous knowledge, which is very useful for public health in the rural settings; and
4. Further studies to understand the distribution, harvesting rate, conservation and threats facing the recorded plants.

Declaration of conflicting interest

The authors declare that they have no competing interest.

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