

Plants used in the treatment of female infertility and other related health issues in Agbor, Ika South, Delta State, Nigeria

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Abstract

An ethnomedicinal survey of plants used to treat female infertility and other ailments in Agbor, Ika South Local Government Area, Delta state of Nigeria was conducted for the purpose of identification and documentation. Information was gathered using a semi-structured questionnaire through oral interviews with informants which included traditional herbal practitioners, traditional nurses and midwives, housewives, community elders, local farmers, and others. A total of 75 medicinal plant species belonging to 45 families were identified and their botanical names, method of preparation, administration and dosage were documented. Most of the preparations were made through decoctions or infusions. The leaves were the plant parts which were mostly used. Most of the species can be sourced locally by harvesting from farms, forests, or bushes, or by buying from local markets. To ensure the preservation and continuity of ethnomedicine, proper documentation and deliberate conservation practices should be adopted.

Keywords: Ethnomedicine; Fertility; Herbal; Traditional Medicine

1. Introduction

The practice of using locally found plants, herbs, and plant parts generally for the purpose of effecting cures and healings in a community has been in existence in many cultures especially in Africa particularly in Nigeria since time immemorial (Torr-anyiin *et al.*, 2003; Orabueze *et al.*, 2017; Madara *et al.*, 2018). The advancement in orthodox medicine has not reduced the zeal and acceptability of this practice; it is even well-entrenched in the African culture because it is more compatible with the beliefs of the populace and records the least side-effects on the human physiology (Orabueze *et al.*, 2017; Madara *et al.*, 2018). The knowledge and practice of herbal medicine is handed down through generations by oral traditions most likely to members of the family to ensure continuity, experience through observations, spiritual *encounters*, and stories (Mokgobi, 2014). According to WHO (2002, 2007), traditional medicine is popular in developing countries and up to 80% of the world population depends on traditional medicines or folk remedies for their primary health care needs, thus making traditional medicine a very important healthcare asset to the society.

Herbal medicines can then be defined as preparation of herbs, herbal materials and finished herbal products that contain whole plants, parts of plants, or other plant materials, including leaves, bark, berries, buds, flowers, and roots, and/or their extracts as active ingredients intended for human therapeutic use or for other benefits in humans and sometimes animals (Phua *et al.*, 2009; World Health Organization, WHO, 2003).

Plants are used to treat a wide range of ailments or diseases by preparing them in different forms such as concoctions, tinctures, macerations, infusions, decoctions, or even chewed raw. Extracts from these leaves and roots are known to correct many different health issues ranging from stopping arthritic pains, correction of erectile dysfunction, enhance

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fertility to restoration of health in post-partum stage, healing of wounds, prevention of infections, easing pains and improving lactation also inclusive (Abdillahi *et al.*, 2013, Salihu *et al.*, 2018).

Approximately one quarter of prescribed drugs contain plant extracts or active ingredients obtained from or modeled on plant substances like Aspirin, atropine, artemesinin, colchicine, digoxin, ephedrine, morphine, physostigmine, pilocarpine, quinine, quinidine, reserpine, taxol, tubocurarine, vincristine and vinblastine (Ansiri *et al.*, 2010, Oladeji, 2016). These plants are easily accessible, relatively cheap compared with western medicines and simple to use. Okoli *et al.* (2007) noted that the history of traditional medicine dates as far back as 4000 years and was the only type of medical system that was available before the advent of modern medicine.

Man has grappled with fertility issues from time immemorial and has been on the lookout for a means to overcome the hydra-headed phenomenon. Childlessness has been a major problem in many marriages, as children are tagged as extremely important in marriages. The failure to produce children is usually because of infertility from either the male or female counterpart and will usually lead to stigmatization. In clinical terms and according to ICMART (2009), infertility regarded as a disease affecting the reproductive system is associated with the failure to achieve a clinical pregnancy after twelve (12) or more months of regular unprotected sexual intercourse. It has been reported that globally, infertility affects 15% of couples which are of reproductive age (WHO, 2010). Infertility can either be primary or secondary.

In Sub-Saharan Africa, a percentage of more than 30% of women aged 25 – 49 suffer from secondary infertility which is the failure to conceive after an initial first pregnancy. However, Etuk (2009) found that males and females contribute equally (40%) in infertility cases while the other 5% cannot be accounted for. In communities like Agbor, herbal medicine plays important roles when it comes to ailments such as infertility, particularly because it is more affordable, preferred and observed to be more effective by its users. Despite its advantages and affordability, herbal medicines are not properly documented as most of its know-how is domiciled within families and among the aged. Most often, it is passed down orally from one generation to the next within the family or on the alternative it dies with the person and the knowledge is lost. Sometimes it is not lucrative, and the younger ones may be more interested in white collar jobs and may not show interest in learning the art.

It is to forestall the loss of this knowledge that this survey was carried out, to identify some ethnomedicinal plants in Agbor (Ika South Local Government Area) used in treatment of various ailments, particularly female infertility with a view to document their medicinal uses, the parts of the plant used, method of preparation, administration, and dosage. The result of the survey will help further research into the medicinal values of various plants towards modernizing the preparation and packaging for better acceptability and competition with its orthodox counterparts.

2. Materials and methods

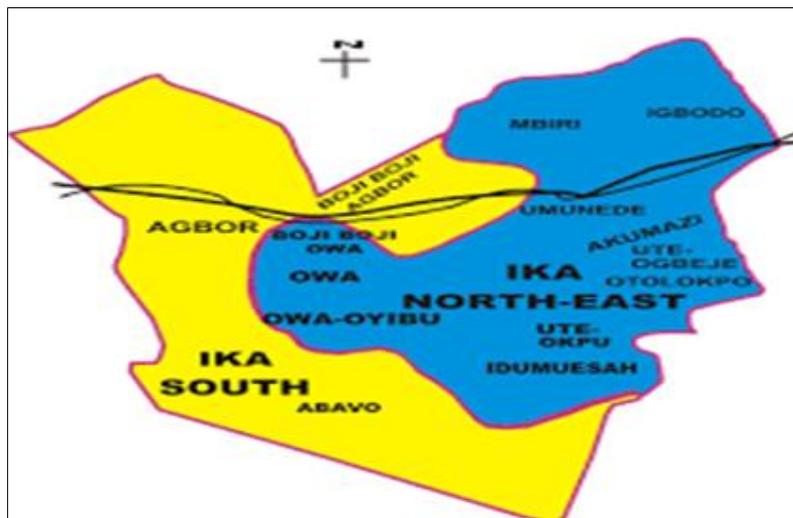
2.1. Study area

This study was carried out in Agbor, Ika South Local Government Area of Delta State in the south-south geo-political zone of Nigeria. This area is located on the geographical co-ordinates of 6.2541° N, 6.2057° E. Agbor is the largest city of the Ika nations and is made up of 24 towns which are - Ogbemudein, Ihogbe, Obielihe, Ihaikpen, Ogbeisore, Ogbeisogban, Agbamuse/Oruru, Alifekede, Omumu, Alisor, Alizomor, Alisimie, Alilehan, Ozanogogo (Ozara), Ewuru, Emuhun, Ekuku-Agbor, Oki, Agbor-nta, Idumu-Oza, Aliokpu, Alihami, Alihagwu and Boji-boji Agbor (Orogodo). Agbor has rich oral/folklore traditions and history which are now going extinct due to poor documentation. Indigenes of Agbor speak Ika language and share similar culture with the Binis. They practice traditional monarchy system of government with the King bearing the title of “Obi of Agbor” Kingdom and is called “Dein.” Agbor is blessed with fertile soil which makes farming one of its major traditional occupations. Other traditional occupations are palm oil production, palm wine tapping and hunting.

2.2. Data collection

Information was obtained through personal and oral interviews with informants using a semi-structured questionnaire. The informants included individuals above the age of 18 who are herbalist, herb sellers, traditional birth attendants, mothers, elderly people, and other individuals who are knowledgeable in traditional medicine. The consents of all the respondents were sought before each visit. The interview period was from August 2020 to February 2021. Most of the plant species were collected locally by harvesting from farms, forests, or were bought from local markets. Interviews were held in the local language (Ika language) and thus enabled effective communication and information received were recorded. Plant identification was partly carried out on the field using textbooks and visual observation. Other unknown

plants were identified by the curator in the University of Port Harcourt herbarium. The information collected include the local and common names of medicinal plants or plant part(s), methods of preparation and administration used for treating infertility problems affecting women and other ailments by the people of the study area.



Source: <https://www.ikaweekly.com/ika-spoken-words-language-or-dialect/ika-map/>

Figure 1 Map of Ika land showing the two local government areas.

2.3. Sample of questionnaire

Below is the sample questionnaire used in the survey.

Table 1 Sample of semi-structured questionnaire

A. Informant Details		Response
Name:		
Gender:		
Age:		
Occupation:		
Education:		
Location/Residence:		
B.	Survey Questions	
1.	How long have you been a traditional healer?	
2.	Which plants or plant product have you used for medicinal purposes, if any?	
3.	What ailment(s) do you use it/them for?	
4.	Which part(s) of the plant do you use?	
5.	How is it used: dried or fresh?	
6.	How do you prepare it for use? (Tea, decoction, infusion, poultice, etc.)	
7.	Describe in detail the preparation for each ailment.	
8.	How is the preparation administered?	
9.	How long does a patient need to take the preparation?	
10.	How is the preparation stored?	

3. Results and discussion

This work was undertaken to document the medicinal plants used by the Agbor people, Ika South LGA in the treatment of female infertility. During the study, it was found that treatment of female infertility cannot be isolated from other health related issues in herbal treatment hence the inclusion of the other ailments treated. Results of the finding also reveal that one plant can be used in the treatment of multiple ailments and so except in very few cases, it was found that one plant is used for different ailments so long as the herbalists were ready to give out the information.

Table 2 Plants used in Female related + Menstrual issues.

Ailment	Plant(s) used	Plant preparation	Method of administration
To treat swollen limbs during pregnancy.	<i>Xanthosoma mafafa</i> (Corm) + <i>Asystasia gagentica</i> + <i>Piper guineense</i> (Seeds) + <i>Elaeis guineese</i> (Palm oil).	The plant materials are used to make soup.	Pregnant woman eats the soup with any accompaniment of choice as often as possible.
Treatment of anaemia, to increase blood level and to treat dizziness.	<i>Telfairia occidentalis</i> (Leaves)	A maceration of leaves is made, or leaves are incorporated into dishes or used to make soup.	Patients consumes the maceration or dishes regularly.
To boost female fertility.	<i>Pennisatum purpureum</i> (Leaves).	The leaves are used to make a decoction.	The decoction is consumed one cup daily until symptoms go away.
For the treatment of menstruation disorder	<i>Acanthus montanus</i> (Aerial Parts)	Aerial parts of leaves are macerated, and the juice is filtered out. Or the aerial parts of leaves can be used to make soup.	The filtrate (one cup) or the soup is consumed every morning on an empty stomach for 14 days.
Used for flushing fibroids and for the treatment of general female infertility.	<i>Microdesmis puberula</i> (Leaves)+ <i>Aframomum melegueta</i> (Seeds) + <i>piper guineense</i> (Fruits)+ <i>Allium sativum</i> (Onions + <i>Elaeis guineese</i> (Palm oil) + <i>Capsicum annum</i> (Fruits)	The plant materials are used to make soup.	The soup is consumed using any accompaniment of choice for five days.
A remedy for irregular menstruation.	<i>Cocchorus olitorius</i> (Leaves)	The leaves are macerated with water and then filtered.	The liquid filtrate is consumed one cup a day by patient.
Treatment of fever, menstrual irregularity, hormonal imbalance, threatened miscarriage.	<i>Zingiber officinale</i> (Stem)	Decoction or tea infusion is made.	Consumed one cup every morning on an empty stomach for 14 days.
Enhancement of menstrual flow. Also used to induce abortion in the early stages of pregnancy.	<i>Carica papaya</i> (Seeds)	Seeds are dried and crushed and then mixed with water.	Half cup is taken daily until symptom alleviates.
Treatment of fibroids and general female infertility	<i>Lawsonia inermis</i> (Leaves) + <i>Aframomum melegueta</i> (Seeds)	Plant ingredients are cooked in a pot until burnt to ashes. Then it is allowed to cool and grounded into fine powder.	One tablespoonful is mixed with honey or pap and taken every morning for 20 days.

For flushing the body and for the treatment of general female infertility.	<i>Vernonia amygdalina</i> (Leaves)+ <i>Citrus aurantifolia</i> (Fruit juice).	Leaves are macerated with water and filtered. The fruit juice is added to the filtrate.	The mixture is consumed one cup a day for 14 days.
Treatment of general female infertility.	<i>Palisota hirsuta</i> (Roots)	A decoction of plant material is made.	3ml of decoction is consumed 3 times a day for 14 days.
Prevention and treatment of fibroids.	<i>Elaeis guineensis</i> (Unripe Kernel)	Unripe kernels are gotten.	About 25 – 30 unripe kernels are chewed daily for at least 14 consecutive days.
For the treatment of menstrual disorder.	<i>Rauwolfia vomitoria</i> (Roots and Leaves).	A decoction of plant materials is made.	Decoction is consumed one cup three times a week until improvement is observed.
To stop bleeding in threatened miscarriage.	<i>Newbouldia leavis</i> (Leaves).	Leaves are macerated.	Macerated leaves are applied inside the vaginal.
For treating general female infertility.	<i>Tetrapleura tetraptera</i> (Stem bark)	A decoction of plant materials is made.	Decoction is taken one cup every day until positive results are observed.
For treating fibroids.	<i>Setaria anceps</i> (Roots and Leaves).	An infusion or decoction of plant material is made.	Consumed one cup, two times a day for about 14 days.
Treatment of fibroids and for post-partum treatment.	<i>Napoleona imperialis</i> (Leaves)	An infusion of the plant material is made.	Regularly consumed by woman having fibroid related problems or by a woman who just gave birth.
Treatment of menstrual disorder.	<i>Mimosa pudica</i> (Leaves)	Leaf decoction is made.	Decoction is consumed one cup a day until positive results are seen.
Treatment of hypertension and menstrual disorders.	<i>Allium cepa</i> L. (Bulb)	Bulb is macerated and mixed with pure honey.	One tablespoon is taken three times a day.

There is no limit to the kind of ailment that can be treated with medicinal plants from topical issues like eczema, skin rashes to headache, cold, stomach upset and then to the more complicated issues like arthritis, edema, diarrhea, diabetes, heart palpitations, gynecological issues, and cancer (Erhenhi, 2016, Ribeiro *et al.*, 2018, Salihi *et al.*, 2018, Orabueze *et al.*, 2018). It was observed that the medicinal value of the plants and the diseases they are used to treat vary from one herbal practitioner to another.

The plants documented are all medicinally important. Fabaceae, Malvaceae and Apocynaceae are the most recurrent families given by the herbal medicine practitioners. These families have been found to possess one or more phytochemicals or constituents which are exploited in the scientific discovery of drugs (Akomolafe *et al.*, 2012; Burkill, 1985 and NNMDA, 2008). One of the most predominant ailments in this part of the world is malaria, therefore it was not surprising that even though the survey was on infertility, all the practitioners sought to eliminate malaria related conditions during treatment. Menstrual disorders ranging from painful menses, excess bleeding, irregular menses to discoloured menses were part of the conditions that were treated. Plants like *Rauwolfia vomitoria*, is used in the treatment of malaria, correction, and treatment of menstrual disorders and to alleviate pains after childbirth (tabs 2, 4 and 7). *Cocchorus olitorius*, (tabs 2and3) is indicated in the treatment of irregular menstruation as well as to check infection in infants. *Aframomum melegueta* and *Piper guineense* were some of the plants used in the treatment of menstrual disorders. *V. amygdalina*, a well-known vegetable used to prepare soup, is used to flush the body for general infertility and used to treat stomachache, boost immunity, and improve blood flow (tabs 2and 3). While *Costus afer* was used to treat both sleeping sickness and poison. Early fall of the remaining umbilical cord (navel) and healing seem to be the job of *Kalanchoe pinnata* as well as taking care of cough. Treatment of convulsion and maintaining stable temperature is achieved with kernel seed oil of *E. guineense* (tab 3) while the unripe fruit is used in the treatment of fibroids(tab2). Leaves of *C. odorata* and *A. africana* is used in wound healing and to stop bleeding.

Some plants have excelled in the treatment of some ailments, Tiwari *et al.* (2014) and Kumar and Navaratnam (2013) reported that *Azadirachta indica* (neem) is extensively cultivated in the Indian subcontinent and has been used to treat and manage different ailments and diseases like infections, malaria, pains, and fever. Akin-Osanaiya *et al.* (2013) reported a reduction in the level of parasitemia in albino mice infected with *Plasmodium berghei* by about 51-80% when treated with neem leaf extract and by about 56-87% when treated with neem bark extract. Similarly, Nathan *et al.* (2005) and Alzohairy (2016) attributed the antimalarial effect to the presence of azadirachtin and other limonoids while antioxidants are responsible for other health promoting effects. Aravind *et al.*, (2013) noted that the infusion of *Carica papaya* leaf shows efficacy for treatment of malaria.

According to Burkill (1985), the bark of *Anacardium occidentale* (Cashew) contains 9-21% tannins, the fruit and nutshell (oil) contains cardol and anacardic acid. The report of Nwanjo (2005) showed that *Vernonia amygdalina* lowered the blood sugar level in diabetic rats. In herbal medicine different plants can be used in the cure of the same ailment, sometimes it is given as infusion, decoction, macerated and used topically, even used as ingredients for soup. A typical example is the leaves of *T. occidentalis*, *V. amygdalina*.

T. occidentalis used naturally as condiment for soup is used in treatment of menstrual related issues, as a blood booster (Okoli 2013), treatment of cholesterolemia, liver problems and impaired immune defense systems (Eseyin *et al.*, 2005 a,b). Surprisingly the root is poisonous and induces abortion (Okoli 2013). Same plant can be curative and at the same time poisonous as shown by *T. occidentalis* in Okoli (2013).

Table 3 Plants used in other ailments

Ailment	Plant(s) used	Plant preparation	Method of administration
* To prevent infection of the newborn's navel and to foster the healing process. * To foster the healing process. * Helps in the treatment of cough.	<i>Kalanchoe pinnata</i> <i>Lam. (Leaves)</i>	Leaves are warmed by passing them through moderate fire. The leaves are then crushed to extract the juice.	* The juice is regularly applied to a newborn's navel using clean cotton balls. * The juice is regularly applied to external wounds or ulcers. * The juice is regularly taken orally by someone experiencing cough.
To treat swollen limbs during pregnancy.	<i>Xanthosoma mafafa</i> (Corm) + <i>Asystasia gagentica</i> + <i>Piper guineense</i> (Seeds) + <i>Elaeis guineese</i> (Palm oil).	The plant materials are used to make soup.	Pregnant woman eats the soup with any accompaniment of choice as often as possible.
For treating poison ingestion.	<i>Costus afer</i> (Stem cane)	Plant material is gotten, and the leaves are cut out.	Stem cane is chewed and swallowed.
For alleviating sleeping sickness.	<i>Costus afer</i> (Roots)	A decoction of root is made.	Decoction is consumed one cup daily until symptom alleviates.
Used to treat diseases that may cause infections and death of infants.	<i>Corchorus olitorius</i> (Shoot)	A decoction of plant material is made.	A newborn is given 0.5ml of the decoction orally.
Treatment of convulsion/fits. This also help to maintain or stabilize their body temperature.	<i>Elaeis guineensis</i> (Palm Kernel Seed Oil)	Palm kernel seed oil is prepared locally or bought from producers/market.	The oil is used to rub the whole body of a patient.
For healing wounds and ulcers and preventing them from getting infected.	<i>Chromolaena odorata</i> (Leaves)	Plant leaves is used to make a poultice.	Poultice is applied on external wounds and ulcers

Used to control bleeding of wounds or injuries	<i>Aspilia Africana</i> (Leaves)	Leaves are used to make a poultice.	Poultice is applied to external injuries or wounds
For treating stomachache. To regain lost blood and to boost immunity.	<i>Vernonia amygdalina</i> (Leaves)	Macerated with water and then filtered. Or can be used to make soup.	Soup or filtrate is consumed regularly until positive results are seen.
For the treatment of diarrhea.	<i>Anacardium occidentale</i> (Leaves)	Fresh young leaves are gotten.	Leaves are chewed and swallowed.
For treating abdominal pains and gonorrhoea.	<i>Dracaena arborea</i> (Roots)	Macerated with local gin or soda water.	Consumed half cup three times daily for 14 days
Treatment of hypertension and menstrual disorders.	<i>Allium cepa</i> L. (Bulb)	Bulb is macerated and mixed with pure honey.	One tablespoon is taken three times a day.
For treatment of snake bites (antivenim). For treatment of skin allergies.	<i>Allium cepa</i> L. (Bulb)	Poultice is made.	Applied to snake bites. Also applied externally on skin allergy.
For the treatment of liver diseases and diabetes.	<i>Allium cepa</i> L. (Bulb)	Decoction is made.	Decoction is consumed half cup daily.
For treatment of fevers and stimulation of lactation.	<i>Allium cepa</i> L. (Bulb)	Bulb is diced. (cut into bits)	Eaten raw.
Used to treat cold, catarrh, cough, diabetes, hypertension, rheumatism.	<i>Bucchozia coriacea</i> Engl. (Seeds) + <i>Citrus aurantifolia</i> Christm. (Fruit juice)	Decoction is made.	Consumed two cups a day until symptoms alleviates.
For treating ringworm.	<i>Senna alata</i> L. Roxb (Leaves) + Palm oil	Leaves are macerated and used to make poultice.	Fresh poultice is rubbed into the affected site two to three times every day.
For boosting sperm count and for boosting flow of milk in lactating mothers.	<i>Annona muricata</i> L. (Fruits)	Fruits are eaten raw.	Fruits are eaten raw or as salads while removing the epicarp (skin) and seeds.
For treating anaemic conditions and blood boost.	<i>Ipomea batatas</i> (L.) Lam.	Fresh and clean leaves are macerated and taken as a tonic or mixed with milk or malt drink. Can also be made as a vegetable sauce and eaten with any accompaniment.	Preparation is consumed as often as possible until symptoms are alleviated.
For stopping vomiting.	<i>Xanthosoma mafafa</i> L. (Schott) (wild variety)	Fresh corm is macerated into a poultice.	Poultice is used to rub on the body joints including the neck.

Table 4 Plants used for treatment of malaria.

Ailment	Plant(s) used	Plant preparation	Method of administration
For preventing malaria or stomachache.	<i>Ocimum gratissimum</i> (Leaves) + <i>Aframomum melegueta</i> (Seeds)	The plant materials are macerated and made into a poultice.	The poultice is applied externally on the lower abdomen of a pregnant woman or used to make soup.
For the treatment of malaria.	<i>Carica papaya</i> (Leaves)	A decoction of leaves is made. Sometimes the leaves of <i>Cymbopogon citratus</i> are combined to make decoction.	The patient consumes one cup of decoction daily until symptoms go away.
For the treatment of malaria and typhoid.	<i>Moringa oleifera</i> (Leaves)	A decoction of leaves is made, or leaves are macerated with local gin and filtered.	One cup two times a day until symptoms alleviates.
For the treatment of malaria	<i>Rauwolfia vomitoria</i> (Leaves and Stem bark).	A decoction of plant material is made.	One cup is consumed two times a day until symptoms alleviates.
For treating stomachache. For treating malaria. To regain lost blood and to boost immunity.	<i>Vernonia amygdalina</i> (Leaves)	Macerated with water and then filtered. Or can be used to make soup.	Soup or filtrate is consumed regularly until positive results are seen.
Decoction is used in the treatment of malaria.	<i>Cymbopogon citrates</i> (Leaves)	Decoction of leaves or leaves are crushed and mixed with pure honey.	Consumed regularly on daily basis.
Treatment of whitlow on any part of the fingers or toes.	<i>Sida acuta</i> (Leaves)	Fresh leaves are harvested and macerated.	The macerated leaves are applied topically on a finger with whitlow until the whitlow becomes soft enough to burst and expel the contents within.

Table 5 Plants used for sexually transmitted infection.

Treatment of gonorrhoea.	<i>Microdesmis puberula</i> (Roots)	Decoction of roots is made.	Root decoction is consumed one cup 2 times a day for 7 days.
For the treatment of gonorrhoea.	<i>Crassocephalum crepidiodes</i> (Leaves)	Leaf decoction is made.	Consumed one cup, three times a day for 7 days.
Treatment of gonorrhoea.	<i>Gossypium hirsutum</i> (Leaves and Roots)	An infusion or decoction is made.	Consumed one cup 2 times a day for ten days.
For treating gonorrhoea.	<i>Dracaena arborea</i> (Roots)	Macerated with local gin or soda water.	Consumed half cup three times daily for 14 days
For the treatment of gonorrhoea.	<i>Glyphaea brevis</i> (Leaves) + <i>Eko</i>	Leaves are chewed with "eko".	Taken three times a day for fourteen days.
For treating gonorrhoea and haemorrhoid.	<i>Baphia nitida</i> (Root bark)	An alcoholic decoction of root bark is made using any local gin.	Consumed one cup 3 times daily for 7 days.

Table 6 Plants used for prevention of miscarriage.

Ailment	Plant(s) used	Plant preparation	Method of administration
Used to prevent miscarriage during pregnancy.	<i>Solenostemon monostachys</i> (Leaves)	A decoction of leaves is made adding a pinch of salt.	One cup of decoction is taken on a regular basis.
For preventing miscarriage and for postpartum treatment.	<i>Xylopi aethiopica</i> (Seeds)	Seeds are crushed and used to make soup or mixed with honey.	The soup or honey mixture is consumed regularly
To make the pelvic/hip bones soft for safe delivery and to ease nauseous feelings during pregnancy.	<i>Garcinia kola</i> (Seeds) + <i>Aframomum melegueta</i> (Seeds) + Native chalk (nzuhn)	The plant materials are used to make a decoction.	A pregnant woman consumes half a cup of this decoction orally once a day, for three consecutive days and then occasionally.
Used to prevent miscarriage	<i>Acanthus montanus</i> (Leaves) + <i>Edible mushroom</i> (Inro) + Eko Agbor	The plant ingredients are roasted. Then adding eko, they are grounded into powdery form.	Taken by pregnant woman regularly.
Used for preventing miscarriage and used to boost the libido as well.	<i>Ageratum conyzoides</i> (Leaves)	Fresh leaves are harvested and macerated.	Inserted into the vaginal.
Treatment of fever, menstrual irregularity, hormonal imbalance, threatened miscarriage.	<i>Zingiber officinale</i> (Stem)	Decoction or tea infusion is made.	Consumed one cup every morning on an empty stomach for 14 days.
For preventing miscarriage, malaria, or stomachache.	<i>Ocimum gratissium</i> (Leaves) + <i>Aframomum melegueta</i> (Seeds)	The plant materials are macerated and made into a poultice.	The poultice is applied externally on the lower abdomen of a pregnant woman or used to make soup.
Prevention of miscarriage.	<i>Elaeis guineensis</i> (Spadix and Roots).	A decoction of plant materials is made.	One cup is consumed three times a week from conception to delivery/childbirth.
To control blood flow after delivery and used to prevent miscarriage during pregnancy.	<i>Chromolaena odorata</i> (Leaves)	A decoction of fresh leaves is made. Or fresh leaves are used to make soup.	The decoction is consumed one cup a day patient. Or Soup is consumed by patient with any accompaniment daily.
Helps to keep the foetus in place and helps to prevent miscarriage.	<i>Amaranthus spinosus</i> (Leaves) + <i>Cocos nucifera</i> (Coconut water) + Native chalk + "eko"	Plant materials are macerated and mixed with other ingredients and water. The mixture is macerated generally.	: 5ml of the mixture is consumed by pregnant women twice a day. The traditional nurse also massages the pregnant woman to keep foetus in place.
Treatment of continuous or frequent miscarriage commonly called "Belleh dey hot" or "hot belleh" and locally called "Ihen-ofifi"	<i>Nauclea diderrichii</i> (Leaves) + <i>Aframomum melegueta</i> (Seeds) + <i>Elaeis guineensis</i> (Palm oil)	The plant materials are macerated and mixed.	Patient consumes this regularly for about 30 days.
To stop bleeding in threatened miscarriage.	<i>Newbouldia leavis</i> (Leaves).	Leaves are macerated.	Macerated leaves are applied inside the vaginal.

Treatment of threatened miscarriage	<i>Sida acuta</i> (Roots and Leaves)	Plant materials are macerated in water and filtered.	Filtrate is consumed one cup a day until symptoms alleviates.
To prevent miscarriage.	<i>Ceiba petandra</i> (Stem bark).	Decoction of plant material is made.	Consumed regularly.

Table 7 Plants used in post-partum treatment.

Ailment	Plant(s) used	Plant preparation	Method of administration
Preparation: To aid in safe delivery and for post-partum treatment.	<i>Gangronema latifolium</i> (Leaves) + <i>Napoleona imperialis</i> (Leaves)	A 3-days infusion is made with plant materials.	Consumed regularly before and after childbirth.
For treating fibroids.	<i>Setaria anceps</i> (Roots and Leaves).	An infusion or decoction of plant material is made.	Consumed one cup, two times a day for about 14 days.
For post-partum treatment, can also be an abortifacient if consumed during the early stages of pregnancy.	<i>Aframomum chrysanthum</i> Lock. (Seeds)	Seeds are crushed and used to make light soup or used to make concoction.	Consumed by woman after childbirth, from the day of child delivery until 14 days later.
For the treatment of pains after child delivery.	<i>Rauwolfia vomitoria</i> (Roots and Leaves)	Plant materials are macerated in water and then filtered.	Filtrate is consumed one cup every day until positive results are observed.
For treating abdominal pains and for cleaning the womb after childbirth.	<i>Monodora myristica</i> (Seeds)	Seeds are crushed and used to make soup or mixed with honey.	One teaspoon is consumed three times a day or soup is consumed regularly.
To control blood flow after delivery and to prevent miscarriage during pregnancy.	<i>Chromolaena odorata</i> (Leaves)	A decoction of fresh leaves is made. Or fresh leaves are used to make soup.	The decoction is consumed one cup a day patient. Or Soup is consumed by patient with any accompaniment on a regular basis.
Enhancement of menstrual flow. Also used to induce abortion in the early stages of pregnancy.	<i>Carica papaya</i> (Seeds)	Seeds are dried and crushed and then mixed with water.	Half cup is taken daily until symptom alleviates.
Remedy for bleeding after child delivery, also used to prevent miscarriage during pregnancy.	<i>Solenostemon monostachys</i> (Leaves)	A decoction of leaves is made adding a pinch of salt.	One cup of decoction is taken on a regular basis.
For preventing miscarriage and for postpartum treatment.	<i>Xylopia aethiopica</i> (Seeds)	Seeds are crushed and used to make soup or mixed with honey.	The soup or honey mixture is consumed regularly

Table 8 Plants used in prevention of infertility and aids.

Prevention of	Infertility/	Aids	Fertility
To treat swollen limbs during pregnancy.	<i>Xanthosoma mafafa</i> (Corm) + <i>Asystasia gagentica</i> + <i>Piper guineense</i> (Seeds) + <i>Elaeis guineese</i> (Palm oil).	The plant materials are used to make soup.	Pregnant woman eats the soup with any accompaniment of choice as often as possible.
To make the pelvic/hip bones soft for safe delivery and to ease nauseous feelings during pregnancy.	<i>Garcinia kola</i> (Seeds) + <i>Aframomum melegueta</i> (Seeds) + Native chalk (nzuhn)	The plant materials are used to make a decoction.	A pregnant woman consumes half a cup of this decoction orally once a day, for three consecutive days and then occasionally.
Easing prolonged labour.	<i>Carica papaya</i> (Roots of male plant) + <i>Aframomum melegueta</i> (Seeds)	Plant materials are rinsed and assembled.	Patients chews the plant materials.
To prevent nausea.	<i>Garcinia kola</i> (Fruits).	Chewed and consumed by pregnant women.	Taken by pregnant women in the first trimester of pregnancy (≤ 3 months).
Helps to keep the foetus in place to prevent miscarriage.	<i>Amaranthus spinosus</i> (Leaves) + <i>Cocos nucifera</i> (Coconut water) + Native chalk + “eko”	Plant materials are macerated and mixed with other ingredients and water. The mixture is macerated generally.	: 5ml of the mixture is consumed by pregnant women twice a day. The traditional nurse also massages the pregnant woman to keep foetus in place.
For the treatment of general female infertility. It also promotes conception.	<i>Newbouldia leavis</i> (Leaves) + <i>Kigelia africana</i> (Leaves)	Infusion or decoction of plant materials is made.	Consumed two times a day (5ml) for 30 days.
To aid the delivery of the placenta. A pinch of salt is added to the filtrate to relieve stomach bite/upset.	<i>Phyllanthus amarus</i> (Leaves)	Macerated with water and filtered.	Filtrate is consumed by patient
Treatment of general female infertility.	<i>Combretum apiculatum</i> (Roots)	Decoction of plant materials is made.	One cup is consumed every morning for 14 days.
Treatment of general female infertility.	<i>Aristolochia repens</i> (Roots) + <i>Tetrapleura tetraptera</i> (Roots) + <i>Allium sativum</i> (Cloves) + <i>Kigelia Africana</i> (Leaves)	Decoction of plant materials are made.	Half cup of decoction is consumed 2 times a day until positive results are observed.
Honey is mixed with crushed leaves in the treatment of general female infertility.	<i>Cymbopogon citrates</i> (Leaves)	Decoction of leaves or leaves are crushed and mixed with pure honey.	Consumed one cup 2 times daily.

From this survey, it has been observed that ethnomedicinal plants and the herbal healthcare systems are available, more affordable, and accessible than modern healthcare and as a result, preservation of herbal medicine should be encouraged. This survey faced some challenges especially in the aspect of the documentation of local names. Ika, as a minor local language have faced some threats related to modernization, as a result, many traditional knowledge and local names have been lost. Another challenge is that younger generations are not interested in the practice of herbal medicine (Sani and Aliyu, 2011).

Also, deaths of aged traditional practitioners, loss of important biodiversity (Soladoye *et al.*, 2006) and religious affiliations have led to major losses of vital traditional information and herbal practices/knowledge. This however increases the need for more research, documentation, and conservation of traditional herbal knowledge and ethnomedical plants.

4. Conclusion

The study of the plants used in the treatment of female infertility and other health related issues reveals that herbal medicine is a very important and acceptable part of the Nigerian culture. The herbs are prepared as concoction, decoctions, infusion, powder. *Rauwolfia vomitoria* was effective in the treatment of malaria, and in post-partum care. *Xanthosoma mafafa* was used to treat swollen feet and vomiting. *Kalanchoe pinnata* used to treat cough and navel healing in newborn. There is need for scientific study on these plants to enhance acceptability as alternative to orthodox medicine.

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interest between the authors.

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