TRADITIONAL TREATMENT OF FEMALE INFERTILITY: YORUBA PERSPECTIVE

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ABSTRACT
This survey was to conserve knowledge of indigenous medicine through identification and documentation of the recipes and plants used in the treatment of female infertility by the Yoruba people of Southwestern Nigeria. An ethnobotanical survey was conducted using oral informal interviews. The target respondents included diviners/spiritualists, herb sellers, traditional birth attendants, farmers/hunters and other members of the community. The survey yielded 12 recipes recorded with all being orally administered. There were 30 plants distributed in 21 families; 20% of which are climbers, 20% herbs, 23% shrubs and 37% trees. Leaves (26.67%) were the most utilised part while the least utilised are rhizomes (3.33%). Materials of animal and mineral origin were also utilised. It is hoped that the documentation provided from this study will help in the conservation of knowledge of traditional medicine and to serve as a bedrock for further scientific evaluation.

Key words: Ethnobotany; Southwestern Nigeria; female reproduction; herbal medicine recipe; plant life forms.

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INTRODUCTION
Traditional, folk or herbal medicine is the most ancient method of curing diseases. It has been reported that plants are the first and only true medicines ever used (Gill, 1992). The World Health Organisation (WHO) estimates that over 80% of health-care needs are met by traditional health-care practices (WHO, 2002) due to their accessibility, availability and affordability. Hence, the most common traditional medicine practiced across Africa is the use of medicinal plants. Africa is the cradle of mankind with a rich biological and cultural diversity, making its traditional medicine system the oldest and, perhaps, the most assorted (Mahomoodally, 2013). The Yoruba people of southwestern Nigeria, Africa’s most populous country, are a major ethnic group accounting for about 21% of the country’s population (Ogundele, 2007). Holding a reservoir of traditional medicinal practices in the treatment of various diseases, they inhabit areas from western Africa to other parts of the world (Abimbola, 2006). Yorubas are about 47 million people worldwide. Healing in Yoruba tradition is achieved through the use of whole, part or products of plants, animals and mineral substances. These are usually used singly or mixed (Borokini and Lawal, 2014).

Ethnobotanical research searches for potentially valuable medicinal materials (Schultes, 1994) beginning with a survey of the various plants used by the people in the prevention, treatment and/or control of a disease or an adverse physical condition. Resource persons include skilled herbalists and diviners. Others are hunters, community elders, traders, travelers and other members of the community. As a result of a rapid and continuous erosion of valuable traditional knowledge, there is a pressing need for the documentation of medicinal uses of African plants and traditional medicine systems (Mahomoodally, 2013).

The United Nations Population Funds (UNFPA) at the International Conference on Population and Development (ICPD) in 1994 defined reproductive health as a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity. This includes all matters relating to the reproductive system and its functions and processes. Zegers-Hochschild et al. (2009) clinically defined infertility as a disease of the reproductive system as being the failure to achieve a clinical pregnancy after 12 months, or more, of regular, unprotected sexual intercourse. The World Health Organisation (WHO) estimated that between 8 and 12% of
couples experience some form of infertility during their reproductive lives (15-44 years), thus affecting 50 to 80 million people worldwide. Out of this number, 20-35 million couples in Africa are affected. Africa continues to suffer from high rate of infertility especially in parts of West, Central and Southern Africa (Mascarenhas et al., 2012). The rate of infertility in African countries ranges from 15-30% (Umeoru, 2007). In Nigeria, couples suffering from infertility have been extrapolated in some parts being as high as 20% (Okonofua, 2003) and 45% (Adetoro and Ebomoyi, 1991).

The most common cause of infertility is ovulation disorder, which occurs in 40% of women with infertility issues (Jose-Miller et al., 2007). This results from hormonal abnormalities or imbalances. More than 85% of infertile women in sub-Saharan Africa have a diagnosis of infertility attributable to an infection compared with 33% of women worldwide (Mascarenhas et al., 2012).

Presented here are a compilation and analyses of the ethnobotanical information on the plants and recipes used in the management of female infertility in Southwestern Nigeria. Hopefully, this will serve as bedrock for further investigation into the plants to ascertain the phytochemicals responsible for the reported activities as well as possible cultivation of these plants as a conservation method.

MATERIALS AND METHODS

The ethnobotanical survey was carried out across Lagos, Ogun, Oyo, Ondo and Ekiti states (south western region of Nigeria). The map of the study area is shown in Figure 1. Informal oral interviews were conducted using modified recommendations by Martin (1995) in order to obtain ethnobotanical information on medicinal plants and traditional medicine preparations used in management and treatment of female infertility within the study area. The target respondents were randomly selected to include diviners/spiritualists, herb sellers, traditional birth attendants, farmers/hunters, elderly members of the community and other individuals the community regards as possessing handed-down or acquired knowledge of medicinal plants around them. Some of the respondents were materially and/or monetarily incentivised to encourage them to give relevant information. The interviews covered recipes, plant and part used, method of preparation, mode of administration and dosage (Soladoye et al., 2014). The interviews were conducted in Yoruba with repeated visits to some respondents who volunteered to embark on field trips for specimen collection.
Figure 1: Map of the study area in Nigeria

Study area for the ethnobotanical survey was within the southwestern region of Nigeria. It included Lagos, Ogun, Oyo, Ondo and Ekiti states. Field trips were also conducted to collect samples of some of the plants mentioned in the course of the interviews, including both vegetative and reproductive parts from the wild, home gardens and herbal markets with the help of some of the respondents. They were identified and authenticated with voucher specimens deposited at the University of Lagos Herbarium (LUH) and the Forestry Research Institute of Nigeria (FRIN), Ibadan (FHI).

RESULTS

Mode of preparation, administration and dosage of recipes
A total of 12 recipes was recorded (Table 1) for the treatment of female infertility and all are orally administered. The recipes obtained for treating female infertility involve the use of plants, animals and inorganic materials. Part(s) used, method of preparation, administration, dosage and caution are also stated.
Table 1: Recipes for treating female infertility in southwestern Nigeria

| Recipe | Ingredients | Local Name (Yoruba) | Part Used | Method of Preparation | Administration and Dosage | Caution |
|--------|-------------|---------------------|-----------|-----------------------|--------------------------|---------|
| 1      | *Momordica charantia* L. *Ocimum gratissimum* L. *Vernonia amygdalina* Del. *Tragia benthamii* Baker Distilled spirit | Ejinrin-wewe Efinrin Ewuro Esinsin funfun Oti | Leaf Leaf Leaf Leaf | Wash all ingredients and crush together with little water. Make-up the volume to 75 cl with distilled spirit | Drink 20 ml daily | |
| 2      | *Portulaca quadrifida* L. *Chaerephon nigerae* (Thomas, 1913) | Biyenme/awaiye-ma-ku Adan | Whole plant Whole bat | Roast *Chiroptera* sp. and dust off the hairs. Grind the plant into paste and cook with the bat as soup | Eat up the soup with desired food, then eat the bat | Avoid burning the bat, take immediately after menses |
| 3      | *Pistia stratiotes* L. *Cocus nucifera* L. *Bostaurus* (Linnaeus, 1758) | Oju-or Aghon Maalu | Leaf Fruit Beef | Cook the beef, grind the leaves and cook all in coconut water | Eat as soup with a desired food | This will only work if fibroid is absent |
| 4      | *Euphorbia hirta* L. | Ege-gogoro | Whole plant | Clean whole plant and pound | Eat as soup with desired food or simply drink | Use soon after menses |
| 5      | *Cola nitida* (Vent. Ex Endl.) Schott et Endl. Distilled spirit | Igi obi Oti | Tree sap | Bottle the sap in distilled spirit and shake-up | Drink 20 ml daily | |
| 6      | *Annona senegalensis* Pers. *Musa paradisiaca* L. | Abo Ogode agbagba | Fruit Fruit | Cut up the flesh of freshly picked *A. senegalensis* fruit, grind and plaster unto peeled fruit of *M. paradisiaca*, then roast | Eat as desired | Do not burn or scrape-off the *A. senegalensis* fruit |
| No. | Plant Name                                              | Parts Used           | Preparation                                                                 | Dosage                                                                 |
|-----|---------------------------------------------------------|----------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|
| 7   | *Citrullus colocynthis* (L.) Schrad                   | Bara Epakun Ope Agbado | Cut and boil or soak plant parts in palm wine (stem sap) or supernatant from uncooked pap from *Zea mays* | Drink 20 ml daily for 2 weeks                                           |
|     | *Curculigo pilosa* (Schm. & Thonn.) Engl.             |                      |                                                                             |                                                                        |
|     | *Elaeis guineensis* Jacq.                              |                      |                                                                             |                                                                        |
|     | *Zea mays* L.                                          |                      |                                                                             |                                                                        |
| 8   | *Dissotis rotundifolia* (SM.) Triana                  | Awede, awede-epa Ata-josin Ope Iru Iyo Eja-aro | Pluck the leaves avoiding the stalk and chop finely. Cook as soup with salt, oil, pepper and fermented *P. biglobosa* seeds without artificial seasoning. Add the fresh fish and eat immediately from the pot | Eat first thing in the morning for 2 to 3 days Make a fresh soup each day |
|     | *Capsicum annuum* L.                                   |                      |                                                                             |                                                                        |
|     | *Elaeis guineensis* Jacq.                              |                      |                                                                             |                                                                        |
|     | *Parkia biglobosa* (Jacq.) G. Don                      |                      |                                                                             |                                                                        |
|     | Sodium chloride                                        |                      |                                                                             |                                                                        |
|     | *Clarias gariepinus* (Burchell, 1822)                  |                      |                                                                             |                                                                        |
| 9   | *Ricinus communis* L.                                  | Lara Ata-josin Iyere Ope Iyo Eja-aro | Make into soup in an earthen pot using fermented *R. communis* seeds       | Eat directly from the pot 1 fish per day first thing in the morning before speaking. On day 9, ask husband or a male relative to take the pot to a T-junction and break it |
|     | *Capsicum annuum* L.                                   |                      |                                                                             |                                                                        |
|     | *Piper nigrum*                                          |                      |                                                                             |                                                                        |
|     | *Elaeis guineensis* Jacq.                              |                      |                                                                             |                                                                        |
|     | Sodium chloride                                        |                      |                                                                             |                                                                        |
|     | 9 medium sized *Clarias gariepinus* (Burchell, 1822)   |                      |                                                                             |                                                                        |
| 10  | Locally bred *Gallus gallus domesticus*                  | Adiye ibile lolo    | Grind to dust, add a little water and draw out “ogbe- alaja” (an *odu ifa*). Then wash off with water | Drink immediately after monthly period Intercourse must be with a single partner |
|     | *Lolo stone*                                            |                      |                                                                             |                                                                        |
| 11 | *Cissampelos owariensis* P. Beaux ex DC. | Jokooje | Leaf | Soak or boil in water | Drink freely |
|----|----------------------------------------|----------|------|----------------------|-------------|
|    | *Angreacum distichum* Lindl.           | Eela     | Leaf |                      |             |
|    | *Calliandra haematocephala* Hassk.     | Tude     | Leaf & |                     |             |
|    | *Xylopia aethiopica* (Delm) A. Rich   | Eru-alamo | root |                     |             |
|    | *Ancistrophyllum secondiflorum* (P. Beauv.) G. Mann & H. Wendl. | Okuku | Fruit |                     |             |
|    | *Nauclea latifolia* Smith             | Egbesi   | Root  |                     |             |
|    | *Ceiba pentandra* (L.) Gaertn.        | Ogungun  |      |                     |             |
|    | *Enantia chlorantia* Oliv.            | Awopa    | Bark  |                     |             |
|    | *Cassia fistula* L.                   | Kassia   | Bark  |                     |             |
|    | *Uvaria chamae* P. Beauv.             | Gbogbonise | Stem |                     |             |
|    | *Clariasgariepinus* (Burchell, 1822)  | Eja-aro  | Root  |                     |             |
|    | *Bos taurus* (Linnaeus, 1758)         | Maalu    | Fish fillet |               |             |
|    |                                        |          | Cheese |               |             |
| 12 | *Dissotis rotundifolia* (SM.) Triana   | Awede, awede-epa |      | Grind the leaves and make into soup with salt, oil and pepper | Eat soup first thing in the morning for 3 days |
|    | *Capsicum annuum* L.                   | Ata-josin |      |                     |             |
|    | *Elaeis guineensis* Jacq.             | Ope      |      |                     |             |
|    | Sodium chloride                       | Iyo      |      |                     |             |
Plant diversity
A total of 30 plant species distributed in 21 families were identified for the treatment for female infertility in southwestern Nigeria. These are listed with their local and common names in Table 2. The growth habit of the plants varied from climbers (20%), herbs (20%), shrubs (23%) to trees (37%) as shown in Figure 2.

Figure 2: Percentage of occurrence of plant life forms used to treat female infertility in southwestern Nigeria.
Table 2: Species identification for the treatment of infertility in southwestern Nigeria

| BOTANICAL NAME                                      | FAMILY          | GROWTH HABIT | LOCAL NAME (Yoruba) | COMMON NAME                  |
|-----------------------------------------------------|-----------------|--------------|---------------------|------------------------------|
| Ancistrophyllum secundiflorum (P. Beauv.) G. Mann & H. Wendl. | Areceae         | Tree         | Okuku               | Large rattan                |
| Angraecum distichum Lindl.                          | Orchidaceae     | Climber      | Ela                 | Comet orchid                |
| Annona senegalensis Pers.                           | Annonaceae      | Tree         | Abo                 | Custard apple               |
| Calliandra haematocephala Hassk.                    | Mimosaceae      | Shrub        | Tude, Ule           | Powder puff bush            |
| Capsicum annuum L.                                  | Solanaceae      | Shrub        | Ata-josin, asosfeiyeje | Cayenne pepper             |
| Cassia fistula L.                                    | Caesalpinaceae  | Tree         | Kasia               | Golden rain pepper          |
| Ceiba pentandra (L.) Gaertn.                        | Bombaceae       | Tree         | Ogungun             | Kapok                        |
| Cissampelos owariensis P. Beaux ex DC.              | Menismpermaeae  | Climber      | Jokooje             | Velvet leaf                  |
| Citrullus colocynthis (L.) Schrad                   | Cucurbitaceae   | Climber      | Bara                | Bitter melon, bitter        |
| Cocos nucifera L.                                   | Areceae         | Tree         | Agbon               | Coconut                      |
| Cola nitida (Vent. Ex Endl.) Schott et Endl.        | Sterculaceae    | Tree         | Obi                 | Kola nut                     |
| Curculigo pilosa (Schum. & Thonn.) Engl.            | Hypoxidaceae    | Herb         | Epakun              | African crocus              |
| Dissotis rotundifolia (SM.) Triana                  | Melostomaceae   | Herb         | Awede, Agbede- epa | Pink lady                    |
| Elaeis guinensis Jacq.                              | Areceae         | Tree         | Ope                 | African oil palm            |
| Enantia chlorantia Oliv.                            | Annonaceae      | Tree         | Awopa               | African yellow wood         |
| Euphorbia hirta L.                                  | Euphorbiaceae   | Herb         | Ege gogoro          | Asthma herb, hairy spurge   |
| Momordica charantia L.                              | Cucurbitaceae   | Climber      | ejinrin-wewe        | Balsam apple                 |
| Musa paradisiaca L.                                 | Musaceae        | Herb         | Ogede agbagaba      | Plantain                     |
| Nauclea latifolia Smith                             | Rubiaceae       | Shrub        | Egbesi              | African peach, pine cushion tree |
| Ocimum gratissimum L.                               | Lamiaceae       | Shrub        | Efinrin             | Scent leaf                   |
| Parkia biglobosa (Jacq.) G. Don                     | Mimosaceae      | Tree         | Iru                 | Locust bean                  |
| Piper nigrum Schum et Thonn                         | Piperaceae      | Shrub        | Iyere               | Black pepper                 |
| Pistia stratiotes L.                                | Araceae         | Oju oro      | Water lettuce       |                              |
The plant parts with the most common usage were the leaves (26.67%), fruits (20.00%), seeds (16.67%) and roots (13.33%). Bark, stem and whole plant each accounted for 6.67% while the least commonly used plant part was the rhizome (3.33%) as shown in Figure 3.
DISCUSSION

A survey of the various medicinal recipes used in the prevention, treatment and/or control of any disease or adverse physical condition is what should begin an ethnobotanical research. This is because such research seeks potentially valuable medicinal materials (Schultes, 1994). The variety of recipes recorded in the treatment of female infertility in this study is an indication of the diversity of plant species employed by traditional medicine practitioners among the Yoruba people located in southwestern part of Nigeria.

A total of 12 recipes were recorded to treat female infertility all of which are administered orally. Traditional medicine recipes are generally referred to as “herbal medicines” probably because plants have been said to be the first and only true medicines ever used (Gill, 1992). Items from sources other than plants are, however, included in some recipes. This survey revealed that various plant and animal organs along with inorganic materials are employed in the treatment of female infertility. Table salt and distilled spirit (gin) are examples of inorganic items while local fowl and bat are some of the animals employed in the preparation of the reported recipes. Borokini and Lawal (2014) have also reported the use of inorganic and whole or parts of animals in traditional healing system.

A total of 30 plant species belonging to 21 families with varying growth habits were used in the traditional recipes recorded. The most dominant growth habit was tree with 11 species. Elaeis guineensis, a tree earlier reported by Fashola (2015), was also recorded in this study. Species of shrubs mentioned were 7, some of which have been reported in earlier surveys. Examples include Piper nigrum (Fashola, 2015), Xylopia aethiopica (NNMDA, 2013; Soladoye et al., 2014; NNMDA, 2018) and Ocimum gratissimum (Soladoye et al., 2014). Climbers such as Cissampelos owariensis reported in this study had been reported within the study area (Fashola, 2015). The use of Momordica charantia whole plant in the treatment of female infertility has also been reported (Sharaibi et al., 2017). Soladoye et al. (2014) reported Citrullus colocynthis as one of the dominant plants in recipes for the treatment of female infertility within a similar study area.

The most dominant plant parts utilised in the treatment of female infertility from this study are the leaves. As a result of convenience and sustainable collection, leaves have been widely reported as the most sourced plant part for phytomedicine. In northern Peru and southern India Bussmann and Glenn (2010) and Balamurugan et al. (2018) reported leaves as the main part used to treat various gynecological disorders. However, stem and bark were reported by Fashola (2015) as the most widely used plant part in the treatment of female reproductive health problems in Oyo state, southwestern Nigeria.

CONCLUSION

The results of this study have demonstrated the diverse potentials of plants used for the treatment of female infertility among the Yoruba people of South-eastern Nigeria. This collection of information is a documentation for the conservation of indigenous traditional medicine knowledge as well as a footing for scientific evaluation. Since most practitioners collect their materials from the wild, there is the need to create awareness and educate them on sustainable collection and conservation methods such as domestication for personal use and large-scale trade.

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