INTRODUCTION

Procreation is an essential aspect of every culture and each of these cultures have people who have mastered the traditional obstetrics and gynecology particularly treatment of women during pregnancy and child birth. There are some studies who have reported the use of plants and plant materials in women health care particularly during pregnancy and child delivery [1].

In the African culture, particularly South West Nigeria, from the time of detecting pregnancy to the delivery of the child, the use of various plants and plant products are administered. This is because it is believed that these various herbs or plant products will assist the expecting mother in gaining strength, for blood formation as well as ease labor and believed it will enable mother and child to be healthy.

Although, there are knowledge about the use of plants in detecting pregnancy, this has been shown in the ancient Egyptian culture where the wheat and barley test is used and claimed to be 70% accurate, the use of pregnancy test strips and assay has eroded the traditional knowledge of the plants used in various culture in detecting pregnancy. The knowledge on the use of plants in detecting pregnancy in South West Nigeria is an art that is going extinct while in some cases, the plants used are no longer known. This gap of knowledge regarding traditional practice of detecting early pregnancy has, therefore, led to this study. This study aims at carrying out ethnobotanical studies on plants used in detecting early pregnancy, in the Remo and Ijebu areas of Ogun State, Nigeria.

ABSTRACT

Aim/Background: Plants and plants extracts are employed in cultures for religious purposes, as beauty therapies, in the detection and management/treatment of diseases. Materials and Methodology: In this study, an ethnobotanical studies of plants used in detecting pregnancy in Ijebu and Remo areas of Ogun State were carried out using semi-structured to obtain demographic data, local names of plants, the morphological parts used. Furthermore, a phytochemical analysis of two of the identified plants was performed. Topical and urine tests of plants in detecting pregnancy were designed to mimic procedures used in traditional medicine for detecting pregnancy. Results: Five plant species were identified belonging to the families Araceae, Asteraceae, Convolvulaceae, Nyctaginaceae, and Rubiaceae in the survey. The identified plants had the use value (UV) of 0.25 (Culcasia scandens), 0.17 (Ipomoea mauritiana), Boerhavia diffusa while Launea taraxacifolia and Chassalia kolly had the UV of 0.08, respectively. B. diffusa L, C. kolly (Schumach) Hepper tested positive for the presence of flavonoids, alkaloids, and tannins. The onset and duration of symptoms of both B. diffusa and C. kolly leaves at 2000 and 1000 mg were dose-dependent. The hexane, ethyl acetate, and ethanol extracts of B. diffusa and C. kolly exhibited pruritus and restlessness in the in vivo model while the urine of pregnant women caused black spots on the leaves of L. taraxacifolia (Wild) Amin Ex. C. Jeffrey. Conclusion: This study reports a rare knowledge of using plants in detecting pregnancy in the Remo and Ijebu areas of Ogun State, Nigeria.

KEY WORDS: Detection, extracts, plants, pregnancy, Remo and Ijebu areas
The study was carried out by administering semi-structured questionnaires [3,4] which were filled through a face-to-face interview [2,5]. The respondents were herb sellers, traditional medical practitioners (TMP), and midwives. The consent of each respondent was obtained before administering the questionnaire.

The demographic features of the respondents, vernacular names of the plants, mode of usage, and features expected were obtained. The plants mentioned by the respondents were collected and authenticated at the Herbarium of the Department of Pharmacognosy, Faculty of Pharmacy, Olabisi Onabanjo University, Sagamu Campus. The Botanical names of the plants were verified from literature and the International Plant Database (www.ipni.org).

**Plant Materials**

*Collection and authentication*

The leaves of *Culcasia scandens*, *Ipomoea mauritiana*, *Boerhavia diffusa*, and *Launea taraxacifolia* were collected from Sagamu while the leaves of *Chassalia kolly* were collected from Ago-Iwoye in Ijebu North Local Government area of Ogun State. The plants were authenticated by Mr. Owolabi Ogunlana and voucher specimens of the plants are deposited in the herbarium of the Department of Pharmacognosy, Faculty of Pharmacy, Olabisi Onabanjo University, Sagamu Campus.

**Phytochemical Screening**

The phytochemical screening of two of the identified plants was carried out using the methods of Harborne [6].

**Extraction**

The leaves of *B. diffusa* and *C. kolly* were air dried and powdered in an electric blender. The leaves of the plant species were extracted by cold maceration successively with hexane, ethyl acetate, and ethanol. The extracts were each dried under reduced pressure in a rotary evaporator and stored for further studies.

**Urine Test**

In conjunction with the Department of Obstetrics and Gynecology, Olabisi Onabanjo University Teaching Hospital, Sagamu, women who had their pregnancy confirmed using pregnancy tests were included in this study. Apart from the pregnancy test carried out for the women in the laboratory, pregnancy was further confirmed using the pregnancy touch strip.

The leaf of *L. taraxacifolia* was used in the *in vitro* assay. The urine of women in their first trimester and who visited the Antenatal clinic for the first time were used. The consent of each of the pregnant women was obtained, and they were explained to the purpose of the study.

Urine of the women was collected in universal bottles. The method adopted is that used traditionally in which urine is poured in a container on the leaf. The development of spots on the leaves is believed to be a confirmation of pregnancy. This method is similar to the “wheat and barley” method used in the ancient Egypt for detecting pregnancy.

In this study, pregnancy test strips were used to confirm pregnancy before the “spot method” was used. Group 1: Pregnant women at antenatal clinic for the first time (first trimester pregnancy). Group 2: Nonpregnant females.

This study observed the appearance of dark spots and how long it took spots to appear on the leaves in the urine test.

**Topical Test**

Animals used in this study were handled according to the International Guidelines on animal care.

The topical test model used was designed to mimic that used traditionally in human beings. In traditional medicine, the female could be asked to crush the leaves of *B. diffusa* or *C. kolly* or wash her hands with some of the aqueous extracts. Signs of itching and burning sensation are usually used traditionally to confirm pregnancy.

Two of the plants identified in this ethnobotanical study (*B. diffusa* and *C. kolly*) were used for the *in vivo* model.

Female rats of about 12 weeks old were used (n = 35). The females were allowed to mate and pregnancy determined within first 7 days by microscopic method.

Group A: 2000 mg of extract was applied topically on the ears and around the mouth of pregnant female rats.

Group B: 1000 mg of extract was applied topically on the ears and around the mouth of pregnant female rats.

Group C: 2000 mg of extract was applied topically on the ears and around the mouth of nonpregnant.

Group D: Water applied topically on the ears and around the mouth of pregnant rats.

The rats were observed for the time it took the animals to first exhibit itching or any reaction as well as how long the reaction lasted.

**Statistical Analysis**

The demographic information of the respondents is presented as percentage while the onset and duration of symptoms are presented as mean ± standard deviation. The use value (UV) of the species identified were determined [5,7] using the formula:
Fred-Jaiyesimi and Taiwo: Ethnobotanical studies of plants used in detecting pregnancy

UV = Um/n

Um = Total number of use report per species
n = Total number of informant interrogated for each given plant.

RESULTS

The respondents used in this study were Traditional Medical Practitioners (TMP), Herb sellers and traditional midwives from Isara, Ijebu Oru, Ago-Iwoye, Ijebu-Igbo, Ikenne and Sagamu in the Remo and Ijebu areas of Ogun State, Nigeria. Figure 2.

Five plants species from the families Araceae (Culcasia scandens), Asteraceae (Launea taraxicifolia), Convolvulaceae (Ipomoea mauritiana), Nyctaginaceae (Boerhavia diffusa) and Rubiaceae (Chassalia kolly) were identified as used in the studied areas for detecting pregnancy. (Table 1)

DISCUSSION

In every culture, particularly in Africa, conception and procreation are important because they are considered as part of indices of success in marriage as well as generations to whom traditions and norms can be passed on to. The knowledge of which is becoming eroded and lost because of the modern methods of detecting pregnancy.

The area studied was the Remo and Ijebu areas of Ogun State [Figure 1] and questionnaires were administered in six towns to TMP, herb sellers and traditional midwives [Figure 2]. 73% of the respondents were women and most of the respondents (42%) have primary school leaving qualification. About 67% of the respondents claimed that they obtained information on plants used in detecting pregnancy through learning by apprenticeship [Figure 3].

Five plant species from five families whose leaves are used for detecting pregnancy were identified in this survey. C. scandens had the highest UV of 0.25 while C. kolly and L. taraxacifolia had the lowest UV of 0.08 [Table 1].

The phytochemical screening of B. diffusa revealed the presence of alkaloids, flavonoids, steroids, saponins, tannins, and the absence of cardiac glycosides [Table 2]. This is similar to previous phytochemical studies carried out on the leaves of B. diffusa obtained from Kerala, India [8] while C. kolly showed the presence of alkaloids, tannins, cardiac glycosides and lacked saponins, anthraquinone, flavonoids, and steroids. This is also similar to reports of

Figure 1: Map of studied areas

Table 1: Plants used in detecting pregnancy in Remo and Ijebu areas of Ogun State

| Family       | Botanical name          | Common name          | Vernacular name | Morphological part used | UV  |
|--------------|-------------------------|----------------------|-----------------|-------------------------|-----|
| Araceae      | Culcasia scandens P. Beauv | Climbing arum       | Agunmona        | Leaf                    | 0.25|
| Asteraceae   | Launea taraxicifolia (Wild) Amin Ex. C. jeffrey | Wild lettuce       | Yannin          | Leaf                    | 0.08|
| Convolvulaceae | Ipomoea mauritiana Jacq      | Natal cotton plant/giant potato | Atemole          | Leaf                    | 0.17|
| Nyctaginaceae | Boerhavia diffusa L         | Red Spiderling      | Etiponla        | Leaf                    | 0.17|
| Rubiaceae    | Chassalia kolly (schumach) Hepper | Chassalia kolly | Isepe agbe    | Leaf                    | 0.08|

Table 2: Phytochemical screening of Boerhavia diffusa and Chassalia kolly used in detecting pregnancy

| Plant           | Saponins | Alkaloids | Anthraquinone | Flavonoids | Tannins | Cardiac glycosides | Steroids |
|-----------------|----------|-----------|---------------|------------|---------|-------------------|----------|
| Boerhavia diffusa | +        | +         | -             | +          | +       | -                 | +        |
| Chassalia kolly  | -        | +         | -             | -          | +       | +                 | -        |
Fred-Jaiyesimi and Taiwo: Ethnobotanical studies of plants used in detecting pregnancy

Onocha and Ali [9]. Although, the phytochemical analysis of *L. taraxacifolia* was not carried out in this study, previous studies had reported the presence of alkaloids, tannins, and flavonoids [10].

In the topical test, the hexane, ethyl acetate, and ethanol extracts were used. The onset of symptoms of the hexane extract of *B. diffusa* was the shortest compared to that of the ethanol extract, however, the duration of the symptoms of the ethanol extract at 2000 mg and 1000 mg were shorter than that of the hexane and ethyl acetate extracts [Figure 4]. The onset of symptoms exhibited by the hexane extract of *C. kolly* is similar in terms of the time of onset and duration of symptoms to that of *B. diffusa* [Figure 4 and 5].

Traditionally in pregnant women, the symptoms often observed when these plants extracts are used include severe pruritus, itching, and restlessness which can be managed traditionally by applying palm oil to affected areas. In this study, the ethanol and hexane extracts caused immobility on application of the extracts on the animals shortly before itching commenced. Other symptoms are tremor and standing up of fur while in the ethyl acetate extract, immobility occurred in the animals after itching had stopped.

The leaves of *C. kolly* caused itching, twitching, restless, tremor, standing erect of furs, and whiskers as well as pink coloration of the eyes which were dimmed.

The symptoms exhibited on the topical application of the extracts of both *B. diffusa* and *C. kolly* are similar to those caused by abnormal discharges in the brain. This study shows that the extracts of both *C. kolly* and *B. diffusa* are easy absorbed and transported to the brains to cause such effect.

Furthermore, the *in vitro* assay used in this study is similar to the “wheat and barley” test used in detecting pregnancy in women in ancient Egypt.

The minimum time it took the black spots to appear on the leaves of *L. taraxacifolia* was 10 min [Figure 6].

Although, the exact mechanism of action responsible for these reactions in the studied plants is unknown, *B. diffusa, C. kolly,* and *L. taraxacifolia* all possess alkaloids, tannins and flavonoids. It, therefore, shows the possibility of one or a combination of these secondary metabolites reacting with the HgC hormone in pregnant women.
This study has, therefore, been able to document plants used in detecting pregnancy in the Remo and Ijebu areas of Ogun state. Further studies are, however, ongoing to validate the constituents in these plants responsible for the activities.

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