

The Use of *Kigelia africana* in the Management of Polycystic Ovary Syndrome (PCOS)

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ABSTRACT

This paper reports the beneficial effect of twice daily ingestion (a table spoonful) of dried *Kigelia africana* fruit powder in the management of Polycystic Ovary Syndrome (PCOS) in two patients. Both patients had the classical triad of Amenorrhoea, acne and hirsutism. The two were 25 years old and 22 years old spinsters respectively. The ultrasonography was suggestive only in the latter; unfortunately there were no facilities to do the confirmatory serum enzymes assay. The use of herbal preparation restored the menstrual flow in both of them as well as leading to significant reduction in the acne but there was no noticeable effect on the hirsutism. There was no observable side effect associated with the use of the powder. These preliminary data thus suggest that *Kigelia africana* fruit powder may be beneficial for cases of PCOS especially in the developing countries where the new generation oral contraceptives, presently being used for the condition, may not be readily available.

Keywords: *Kigelia africana*; Polycystic Ovarian Syndrome; Amenorrhoea

1. Introduction

Kigelia africana (Lam) Benth (Bignoniaceae) **Figure 1** is widespread across Africa and is found in most wet savannah and riverine areas. Growing over 20 m high, it is semideciduous with grey-brown smooth bark. The fruits are large grey-green “sausages” about 30 - 60 cm long which hang on stalks from the tree [1]. The fresh fruit is poisonous and strongly purgative; for safety reasons, fruits are best prepared for consumption by drying, roasting and fermentation. Each fruit weighs between 5 - 10 kg [1]. The fruit is eaten by several species of mammals, including baboons, bush pigs, savannah elephants, giraffes, hippopotami, monkeys and porcupines [1].

In most parts of Africa the *Kigelia* fruit has a long history of both consumption and topical application. It is valued as an aphrodisiac, a disinfectant and a cure for dermal complaints. Adolescent boys and girls use the fruit for enhancing growth of the genitalia and breasts respectively. Women rub the ointment made from *Kigelia* fruit pulp, into their breast as a skin tightening, breast firming and enlarging treatment. They also use the ointment to ensure a clear blemish-free skin. The Yoruba in South Western Nigeria, the ethnic group to which both the writers and the patients belong, believe the fruit is an antidote to virtually all gynaecological problems. In addition, the fruit is used effectively in dressing sores and wounds both for humans as well as animals and for a wide variety of skin afflictions, ranging from eczema, ulcers, acne, skin



Figure 1. Picture showing *Kigelia africana* fruits hanging on the tree [1].

cancer and fungal infections. Scientific literature confirms the validity of many of these traditional uses due to the presence of numerous secondary metabolites. These compounds include iridoids, flavonoids, fatty acids, sterols, glycosides and naphthoquinones [1-3].

Polycystic Ovary Syndrome (PCOS) remains a syndrome, a heterogenous disorder not a specific disease. As a syndrome, there is a group of symptoms and signs that are recognized to be associated with each other but are without an understood common cause. The usual symptoms and signs identified with PCOS are oligo- or amenorrhoea, infertility, hirsutism, obesity, polycystic ovaries, androgen excess, Insulin Resistance (IR) and elevated LH (Luteinizing Hormone)/FSH (Follicle Stimulating Hormone) ratio. PCOS is the most common endocrinopathy in women, occurring in about 5% of reproductive aged women. Unexplained hyperandrogenism is the key finding. Laboratory evidence of hyperandrogenaemia can often be provided by measurement of serum free or total testosterone, androstenedione or dehydroepiandrosterone sulfate [4,5].

Although not essential to its definition, PCOS will usually be accompanied by polycystic ovaries in about half the women. Differential diagnosis will include non-classic adrenal hyperplasia and androgen producing ovarian tumors. For most women with PCOS trying to conceive, the first medication option is to induce ovulation with clomiphene while metformin will be needed for Impaired Glucose Tolerance (IGT). In women with PCOS not trying to conceive, the menstrual irregularity is usually best treated with the combined oral contraceptive [4].

2. Case 1

The first patient was a 25 year old undergraduate who was to be recruited for the trial of herbal soap because she was noticed to have acne especially on the forearm bilaterally. She later confessed to having amenorrhoea on and off (sometimes for 6 months) since she reached menarche at 14 years. She had not menstruated for about 6 months when first seen. She was also having boils on and off in both armpits and the perineum. She was otherwise in good health and a non-smoker.

Physical examination revealed a well-sized lady with a height of 5 feet 7 inches, a weight of 62 kg and SMR (Sexual Maturity Rating) of 5 (adults). She had hirsutism with male pubic hair distribution, acne that was pronounced on the forearm bilaterally and few acanthosis nigricans. She had two healing boils in the perineum and a blood pressure of 130/90. There were no facilities to assay the necessary serum enzymes.

The lady, who was first seen in September 2008, was commenced on the sun-dried powder of *Kigelia africana* after obtaining her consent, by the first author (OAO). The fruit was identified in the herbarium of the Faculty of Pharmacy, Obafemi Awolowo University, Ile-Ife, Nigeria. The patient was taking 1 tablespoonful of the powder twice daily about 30 minutes before food. The powder was prepared by chopping the ripe fruits into small pieces, sundried and then blended. The powder was prepared

by the third author who is experienced in herbal preparation and the blending was done at the Department of Pharmacognosy, Obafemi Awolowo University, Ile-Ife. By late November, 2008, the lady started menstruating. The menstruation was regular until February, 2009 when the lady discontinued the use of the powder due to fear of long term side effect particularly chronic renal failure which is often touted as a long term complication of herbal remedies.

At the commencement of the treatment, electrolytes, urea and urinalysis were normal. However, the fasting blood sugar was slightly high –6.1 mmol/L, but two-hours postprandial was normal –5.9 mmol/L. With the commencement of the powder, the fasting blood sugar reduced to 5 mmol/L and there was no more recurrence of boils but she would complain of occasional weakness; the blood pressure also stabilized at 110/80 and the electrolytes, urea and liver enzymes remained normal.

By March 2009 after she stopped taking the powder, her cycles relapsed to being irregular. When she was told about the success story in case 2, she started taking the powder in September of 2010 and within 2 months, her menstrual cycle became regular and it has been so up till the time of writing this report.

3. Case 2

The second case was a 22 year old student nurse who complained of her problems while she was assisting one of the authors (OAO) in the clinic. She also complained of intermittent amenorrhoea since menarche at about the age of 13 years and she had not menstruated for about 3 months prior to consultation. No positive family history of similar ailment.

Physical examination revealed a relatively small lady who stood at 5 feet 3 inches and weight of 52 kg. Her SMR was 5; she also had hirsutism but her pubic hair distribution was female's, she had acne on the face and also acanthosis nigricans. She had no boils but had lesions of *Tinea corporis* at the back. There was no other abnormality and the blood pressure was 100/70. The fasting blood sugar was 5.1 mmol/L while 2-hour postprandial was 5.0 mmol/L. The electrolytes, urea and liver enzymes were normal. The ultrasound reports went thus: "Normal echogenic anteverted uterus with central endometrial cavity echo; no gestational sac seen. The follicles in the right ovary are displayed in a beaded fashion around the cortex of the ovary. The ovary is large as it measures 51 mm long, 26 mm AP and 41 mm wide. The left ovary and adnexa are normal. Features are suggestive of right Polycystic Ovary Syndrome (PCOS)." There was no facility to check the serum level of appropriate enzymes.

The lady was commenced on the sun-dried powder of *Kigelia africana* after obtaining her consent, in September, 2009. She started bleeding in January 2010; the

bleeding has since been regular up till date. She had a repeat ultrasonography in August, 2010 which was reported normal. The repeat fasting blood sugar had been ranging between 4.4 - 4.6 mmol/L. Various tests like electrolytes, urea and liver enzymes have been normal till date. The patient is still presently on the powder.

4. Discussion

In developing countries, where the cost of orthodox medical care can be relatively prohibitive, the tendency is for patients with PCOS to present in the gynaecology clinic with infertility. In the reproductive years, PCOS is said to be the most common cause of an ovulatory infertility [4]. Hence it is not surprising that these two cases never sought any medical help until the chance encounter with one of the authors of this article. The authors decided to use the powder because the fruit is said to be useful for all gynaecological problems [5]. It has also been reported that the plant extract is not toxic even at high concentrations [5].

The inability to assay the serum enzymes made it difficult to confirm the diagnosis in these cases but the clinical features and the limited laboratory results were highly suggestive of PCOS especially the case 2. The enlarged right ovary with follicles displayed in a beaded fashion around the cortex of the ovary, in the 2nd case, coupled with the typical clinical features could hardly signal any other problem other than PCOS. The two patients were also showing features of hyper-insulinism especially with the acanthosis nigricans noticed in them; this is also buttressed by the fact that the fasting blood sugar in both of them seemed to be on the high side of normal and the fasting blood sugar levels in the duo were more than the 2-hour postprandial levels. The recurrent boils in the case 1 and the lesions of Tinea corporis in the case 2 are the usual dermatological lesions seen in patients with diabetes mellitus. All these dermatological manifestations were controlled with the use of *Kigelia africana* powder. The subsidence of the skin lesions also coincided with the lowering of the fasting blood sugar.

The restoration of regular menstruation flow in the two patients and the subsidence of the flow in the first case when she discontinued the use of the *Kigelia africana* powder showed that *Kigelia africana* may be effective in the management of PCOS. The reversal of the pathognomonic features of PCOS in the right ovary of the second case, after about a year of therapy on *Kigelia africana* powder, literally suggests the usefulness of the plant in the management of the ailment; however, a randomized clinical trial will be needed to confirm this since a spontaneous improvement cannot be ruled out. This we

will do at a later date.

Since the plant has been shown to have many active ingredients, it will be difficult to infer which ones are therapeutic for PCOS. As it contains sterols, among all other components, it is conceivable that these sterols moderate the high level of LH that is often observed in PCOS. The reduction in size of the right ovary to normal could also have been due to the strong anti-inflammatory effect of the plant which may be due to the presence of specific COX 1 and COX 2 inhibitors. These inhibitors do not have common side effects normally associated with this activity. More work needs to be done to evaluate all these properties [2,3].

The absence of side effect, even though the cases are too few to draw conclusions, is not surprising since the indigenous population, where the plant thrives, has been benefitting from the medicinal properties for centuries without reporting any side effect. However, more scientific work needs to be done on this.

More work also needs to be done on whether the plant can avert the long-term risks of PCOS. These include hyperinsulinaemia, obesity, hypertension, dyslipidaemia, coagulation abnormalities, hyperhomocysteinaemia and hormone-dependent carcinoma particularly endometrial carcinoma. These initial results suggest it may, particularly when combined with behaviour modification like avoidance of alcohol and smoking, weight maintenance and regular exercise.

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