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Antihemorrhoidal Activity of *Dialium guineense* (Ichereku) and the Haematological Profiles of Gravindex Subjects in Emene Enugu State

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ABSTRACT

The antihemorrhoidal activity of *Dialium guineense* (Ichereku) and the haematological profiles of gravindex subjects in Emene Enugu State was investigated in pregnant women suffering from haemorrhoid.

Results showed *Dialium guineense* has no significant effect in decreasing or increasing the haemoglobin concentrations, packed cell volume, white blood cell count and platelet count (P>0.05) in gravindex subjects, however the extract does have effect in reducing the length and size of the protruded hemorrhoid (P<0.05) in pregnant women after administration of the pulp for ten (10) days.

This reduction in the size of the hemorrhoid which was 2.0cm±0.4 in the subjects before the intake of the pulp and 0.6cm±0.1 could be attributed to the high concentration of flavenoids, Tannins and saponins in the pulp of *D. guineense*. Flavenoid is a typical plant based compounds which have been shown to possess anti-inflammatory properties which may help reduce swelling and pain associated with hemorrhoids.

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INTRODUCTION

Dialium guineense also known as the velvet tarmarid is the fruit of the native West African tree. It is also called Icheku in Igbo land, Awin in Yoruba and Tsarmiyarkurn in Hausa Land. It may also be found in other West African countries such as Ghana, senegeal, Guinea and Cote d'Ivoire, central African countries such as Cameroon, Democratic Republic of Congo, in East African countries such as Kenya and Tanzania. *Dialium guineense* has also been introduced and naturalized in other countries including India and southeast Asia (Nwoboshi et al, 2011). The plant can grow up to 15-20 meters (49-66ft) tall with a straight hole and a spreading crown. The bark is smooth, gray and slightly fissured. The leaves were compound with 4-6 pairs of leaf lets that are dark green and velvety above and pale green below. It is in the family of leguminase

Uses: The plant can be used as timber as the wood is valued for its durability and resistance to termite attack. The fruits are edible and hence can be used as food.

Medicinal uses

The plant has been used in traditional medicine for its Anti-bacterial, anti-ulcer, anti-hepatotoxic, antimicrobial, anti-plasmodial, anti-hemorrhoid anti vibrio, antidiarrheal, also used for oral care and as vitamin supplement (Nwoboshi et al 2011).

Chemical Contents are sugar, flavonoids, quercetin, kaempferol, isorhapenti genin, alkaloids, saponins, phenolic acids, glycosides, terpenoids, Tannins, Resins, Oxalates (Oyedapo 2013)

Dialium guineense is a versatile and valuable tree species with a wide range of uses and applications.

The fruit contains an astringent which helps in wound healing.

Haemorrhoids are also known as piles. They are swollen veins in the lowest part of the rectum and anus. They can cause discomfort, pain and bleeding during bowel movements (singh et al, 2015).

Causes of Haemorrhoids are increased pressure on the veins in the rectum and anus often due to pregnancy, childbirth or straining during bowel movements.

Constipation which is due to infrequent bowel movements or hard stools which causes straining leading to haemorrhoids.

Frequent diarrhea can also cause straining and lead to haemorrhoids (Abou-zeid et al, 2018).

Symptoms of haemorrhoids

They are bleeding resulting to bright red blood in the stool or on toilet paper, pain or discomfort during bowel movements, itching or irritation around the anus and swelling of lumps around the anus. Haemorrhoids are common during pregnancy especially in the third trimester. Increased blood volume pressure from the growing uterus and constipation can contribute to the development of haemorrhoids. Our curiosity was stimulated to embark on this research study as a result of common occurrence of this disease in gravindex subjects in our society and to authenticate its anti-haemorrhoids activity.

MATERIALS AND METHODS:

Subjects: Twenty (20) pregnant women in their last trimester with cases of haemorrhoid (Pile) attending antenatal clinic at Grace and Joy maternity hospital Emene Enugu were selected for the study.

Administration of the Extracts:

The fruit of *D. guineense* were purchased in large quantity from our local market within the season (March and April) when it is readily available and shared to gravindex subjects in their last trimester to eat. The length of the protruded haemorrhoid was recorded before the intake of the fruit and after the intake of the fruit. This administration lasted for 2wks.

Phytochemical analysis of fruits.

The fruit of the plant were crushed into aqueous form. This sample was screened for the presence or absence of various secondary metabolites that could be of therapeutic value using standard phytochemical screening procedures described by Trease and Evans (1996) and Harbourne (1973). The extract was tested for alkaloids, flavenoids, tannins, glycosides, reducing sugars, calcium saponin, acidic compounds, resins fats and oil, carbohydrates and steroids.

Toxicity study

The LD_{50} of extract of *D. guineense* in albino mice was determined using Lorke's method. The procedure of determining the lethal dose is by increasing the concentration of the extracts administered to the rats (per body weight) in each group consisting of eight (8) rats per group for five (5) days. The concentration used are 500mg/kg, 1,000mg/kg, 2000mg/kg, 3000mg/kg, 4,000 mg/kg, 5,000mg/kg, 6000mg/kg and 7,000mg/kg per body weight respectively. The mortality rate was determined and a graph plotted to determine the LD_{50}.

Determining the Haematological indices:

Blood samples collected into EDTA sequestrene bottles were used for the haematological studies within hours of sample collected.

The packed cell volume was determined according to the haematocrit method described by Alexander and Griffiths (1993).

The white blood cell count and platelet counts were estimated by visual method of Dacie and Lewis (1991).

Determining the reduction in size of haemorrhoids

The size of haemorrhoids in pregnant subjects can be done using digital rectal examination (DRE) by inserting a gloved finger into the rectum to assess the size texture and tenderness of the haemorrhoids and also using a proctoscope (a hollow tube with a light) to visually examine the rectum and anus.

Again ultrasound waves can also be used to create images of the haemorrhoids and surrounding tissue.

Measuring tape caliberated in millimeter can be used to measure the size and length of the protruded hemorrhoid before the administration of *D. guineense* and after the administration for 10days

Statistical Analysis

The results obtained in this study were analyzed using student's t-test and some were represented in tables and graph.

RESULTS

Table 1: The phytochemical analysis of Dialium guineense

	Alkaloids	Glycosides Terpenoids	Flavenoids	Tan-nins	Saponins	Reducing sugar	Resins	Carbohydrate
Degree of concentration	++	+	+++	++	++	++	+	+++

- **Negative (absent)**

+ Present in small concentrations
++ present in moderate high concentrations
+++ present in very high concentrations

Table 2: Haematological profile and size of haemorrhoid in gravid female subjects before and after *D. guineense*

Groups	HB g/dl	PCV %	WBC per mm^3	Platelet x 10^9/L	Size of hemorrhoid/cm
Group 1 control n=10	14.6± 0.21	43± 0.60	6,470± 32	230±46	___
Group 2 (Gravid hemorrhoid subjects before *D. guineense* n=10	11.5± 0.74	34.5± 1.36	4,350±46	220±35	2.0cm±0.4
Group 2 Gravid haemorrhoid subjects after *D. guineense* for 10 days n=10	10.4±1.16	31.3±0.7	4,000±	208±42	0.6cm±0.1
P value	P>0.05	P>0.05	P>0.05	P>0.05	P<0.05

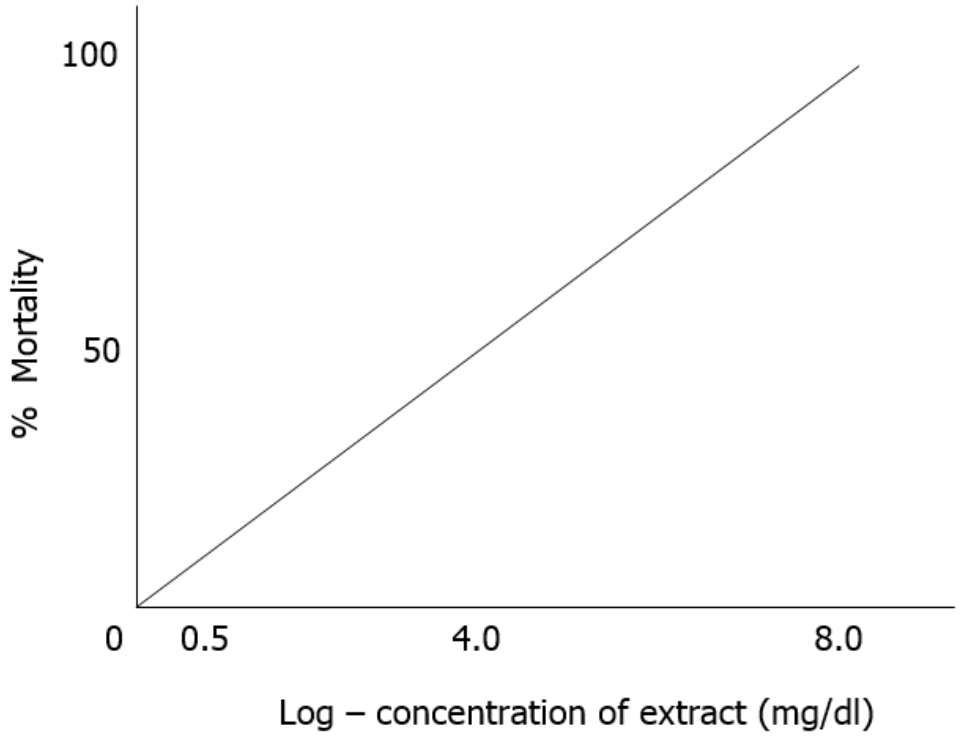

Figure 1: The lethality studies of *Dialium guineense* in rats
Mortality studies showing the effects of administration of graded doses (500-800mg/kg 1.p) of the fruit extract of *Dialium guineense* against the percentage mortality LD 50= 6,000mg/kg body weight

DISCUSSION

Local medicinal herbs and plants have been employed in the management of various diseases and their protective effect on the body from damage due to free radicals and liquid per oxidation has been reported (Pauling 2002). The antihemorrhoidal activity of *Dialium guineense* (icheku) and the haematological profile of gravindex subjects in Emene Enugu State have be studied.

The determination of antihaemorrhoirdal activity and the haematological profiles of the subjects provides information on a proper blood assessment in the body and the effectiveness of *D. guineense* in managing hemorrhoid with simple material around our homes.

In this study, the phytochemical analysis of *D. guineense* was carried out to know the bioactive and non active principles present in the plant. The phytochemical analysis in Table1, shows that carbohydrates and flavenoid elements are present in a high concentration in *Dialium guineense*.

The plant also demonstrated a typical plant nature by containing other elements such as alkaloids, Tannins, saponins, reducing sugar in average concentrations while Glycosides, Terpenoids and resins appeared in a little concentration in the plant.

Study on the effect of this plant on some haematological profile of gravindex subjects used in this study indicates that in Table 2, *Dialium guineense* do not elevate the haemoglobin concentration, packed cell volume platelet count ($P>0.05$), white blood cell count ($P>0.05$), rather it has significant effect on the reduction in size of hemorrhoid ($P<0.05$) in gravindex subjects compared to their corresponding controls. The reduction in size of hemorrhoid in the gravindex subjects in this research could be attributed to the presence of high concentration of flavenoids, Tanning and saponins in the pulp.

Flavenoid is a typical plant based compounds which have been shown to possess anti-inflammatory properties which may help reduce swelling and pain associated with hemorrhoids (Stefano, 2015).

These property may also help to reduce inflammation and alleviate symptoms.

Tannins contained in *Dialium guineense* have also been found to have anti-inflammatory and antioxidant properties which may help reduce inflammation and promote healing in hemorrhoids. Tannins also have astringent property (Zhang, 2015). Other compounds present in *D. guineense* that possess anti-inflammatory are Terpenes, phenolic acids, saponins (Chen, 2018).

These anti inflammatory, anti oxidant properties contained in the plant could help in the healing of hemorrhsoid and also in its reduction in size.

The lethality study also showed that the LD_{50} of the plant is 6,000mg/kg body weight hence its safe use in human beings without damage in human body. The anti inflammatory response associated with these bioactive compounds may involve inhibition of pro-inflammatory cytokines by reducing the production of

pro-inflammatory modecules that contribute to inflammation, Neutralizing free radicals that can cause oxidative stress and inflammation and interacting with cellular pathways involved in inflammation to reduce swelling and pain. All these are the mechanism of action of anti-inflammatory response of saponins, Tannins, phenolic acids and flavonoids present in *D. guineense*. However conventional hemorrhoid treatment involves topical treatments using creams or ointments to reduce pain and swelling, surgical procedures in severe cases and increasing fiber intake, staying hydrated and avoiding straining during bowel movements.

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