Life Science Informatics Publications

Research Journal of Life Sciences, Bioinformatics, Pharmaceutical and Chemical Sciences

Journal Home page http://www.rjlbpcs.com/

RJLBPCS

ISSN 2454-6348

Original Research Article **DOI: 10.26479/2018.0406.54**

COMPARATIVE ANTIDIABETIC POTENTIALS OF GOKO CLEANSER WITH GLABENCLAMIDE AND INSULIN

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ABSTRACT: Investigation of antidiabetic potentials of Dr. Igedos Goko cleanser was carried out in comparison with known antidiabetic agents, insulin and glibenclamide for the period of 28 days. The essence of this study was to confirm if Goko cleanser has antidiabetic properties as claimed by the manufacturer of this drug. Lorke's method was used in determining the acute toxicity of Goko cleanser and the following, 5.4mg/kg, 10.95mg/kg and 16.43mg/kg were obtained and administered orally as low, medium and high dosages respectively on alloxan induced diabetic rats. And the fasting blood glucose levels were determined for the period of 28 days, compared with insulin and glibenclamide administration. The result showed that on day 7 there was significance difference in glucose level between Goko cleanser, insulin and Glibenclamide, $p<0.005$ and same on days 14, 21 and 28 days. Low glucose levels were obtained as the days of treatment with insulin and glibenclamide progressed but glucose levels were raised with Goko cleanser treatment. It is included that Goko cleanser has mild antidiabetic properties in long usage and it is associated with weight gain.

KEYWORDS: Goko cleanser, insulin, glibenclamide, diabetes.

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1. INTRODUCTION

Diabetes is a disease associated with endocrine disorders of carbohydrate metabolism as a result of lack of insulin produced by the pancreatic beta cells. It is characterized by hyperglycemia, polyphagia, polyuria, glucosuria, polydipsia[1]. There are three basic types of diabetes, Type I, type

2 and gestational diabetes. Type I also known as insulin dependent diabetes mellitus (IDDM) is as result of the destruction of the pancreatic beta cells by auto-immune system[2]. It could also result due to hereditary which there is the degenerating beta cells gene[3]. The type 11 diabetes is the non insulin dependent diabetes (NIDDM).This is the most common type of diabetes, which is characterized by insulin resistance and insulin deficiency[4]. It could be genetics or environmental and behavioural induced[5]. The related risk factors are overweight, eating habit, family history of the disease. The third type of diabetes is the gestational diabetes mellitus. It is characterized by glucose intolerance, often associated with pregnancy[6]. This form of diabetes has a lot of implications for the mother and the developing fetus, particularly during delivery, in jaundice, respiratory distress, polycythaemia, macrosomia, hypocalcaemia and hypoglycaemia[7]. The other complications are caesarean sections, pre-eclampsia, ketonemia particularly for the mother[8]. Globally the estimated population of persons living with diabetes has risen from 108 million in 1980 to 422 million in 2014 at percentage of 8.5% in the adult [9]. And in Nigeria it is estimated that about 1.7m Nigerians are living with diabetes. The mortality rate may follow the rate of the prevalence particularly its cardiovascular risk complications. There are many treatment drugs for the disease both clinically and by herbal preparations[10]. [11] Of recent, Goko cleanser has filled Nigeria markets and it is claimed to cure diabetes amidst several ailments[12]. It is called Dr. Igebos Goko cleanser herbal mixture. The composition includes veronia amygdalina. Amygdalina is a tropical plant and is effective against amoebic dysentery[13] and gastrointestinal disorders[14]. It has also antiparasistic activities, [15] and blood sugar lowering potentials[16]. Another content is saccharium offinalis, it is said to posses blood sugar lowering effects; with Allum, sativum [17] and [18]. Cajantus cajan, another content is said to posses anti-diabetic properties[19]. It is the claim of this herbal mixture for the cure of diabetes that prompted our study to confirm its anti-diabetic potentials. It is very necessary for medical scientists to be involved in finding cure for debilitating diseases[20] and [21]. This will check influx of commercialized fake drugs vendors which may afflict the teaming population with health complications with toxic and non potent crude drugs. The Ministry of health particularly the Pharmaceutical Department should publish contents of all new drugs that are sold in the market after such has been tested on animal tissues e.g. kidneys, liver and the heart. Herbal remedies should be co-opted into orthodox prescription as some of them are more potent than orthodox,[21], but the use should be monitored. Dr Igedos is commended for being part of the solution to health problems but should monitor the product to avoid adulteration.

2. MATERIALS AND METHODS

A total of thirty (30) male and female albino rats weighing between 80 and 150g and also thirty (30) mice of 17g and 30g were used for the study. They were fed with pellets and water and kept in a well ventilated animal house of the Department of Pharmacology University of Uyo. The animals were maintained according to the regulation of Institute of Animal and Ethical Committee IAEC of Helsinki 1964.

Acute Toxicity Test

The acute toxicity test was done according to[22]. Thirty mice were divided into five groups with six animals in each group. They were administered intraperitoneally (IP) with 30mg/kg 40mg/kg, 50mg/kg, 60mg/kg 65mg/kg 70m/kg. The animal, were observed within 24 hours for signs of toxicity e.g. restlessness, increase respiration and death. The Lethal dosage was determined by the maximum dose that produced no mortality which was 50mg/kg and the minimum dose that produced mortality (60mg/kg) $LD_{50} = A \times B$

Where:

A = maximum dose that produced no mortality.

B = Minimum dose that produced mortality (60mg/kg)

$LD_{50} = \sqrt{50x60}$

$= 300 \sqrt{\ } = 54.77$mg/kg.

Induction of Diabetes

A solution of alloxan monohydrate 150mg/kg was administered intraperitoneally to the rats. The rats were allowed to rest for 72hrs before glucose levels were determined. This was done by the glucose strip which blood from the cut tail of the rats was dropped on and inserted into the glucometer and the glucose levels recorded. Diabetes in the rats was determined based on the range of values. Rats with Values above 120mg/dl to 450mg/dl were considered diabetic.

Administration of Drugs

It was administered as follows into the rat orally usually canula by-passing the oesophagus and delivered into the stomach [23]. Low dose = 10% of 54.77mg/kg=5.4mg/kg, medium dose i.e =20% of 54.77mg/kg =10.95mg/kg, high dose = 30% of 54.77mg/kg = 16.43mg/kg. These ranges of dosages were the ones that could produce significant anti-diabetic effect if such was available in the drug. The rats died at increase dosage of 60mg/kg. Specifically animals were grouped as contro (alloxan induced) without treatment, i.e group 1,group 2 control without diabetes, Group 3 insulin given intraperitoneally as directed by manufacturer, group 4 rats were given 5mg/kg of

glibenclamide orally using canula as in the usage directive. Group 5 rats were given Goko cleanser as per the dosage above ie 10%, 20% and 30%. Only the 30% ie the high dose had the mild lowering effect on the blood level of the diabetic rats.

3. RESULTS AND DISCUSSION

Table 1: Comparative Effects of Goko Cleanser Herbal Mixture, Insulin and Glibendamide on Alloxan Induced Diabetes

GROUPS	GLUCOSE LEVEL BEFORE ALLOXAN IDUCTION IN Mg/ml	GLUCOSE LEVEL AFTER INDUCTION Mg/ml	GLUCOSE LEVELS/ DAY 7 Mg/ml	GLUCOSE LEVEL DAY 14 Mg/ml	GLUCOSE LEVEL DAY 21 Mg/ml	GLUCOSE LEVEL DAY 28 Mg/ml
Control with diabetes without treatment	84.8±12 P<0.05	447.8±26.5 P<0.05	509.8±49.34 P<0.05	15.8±46.0 P<0.05	439.8±46.0 P<0.05	274.8±37.2 P<0.05
Control without alloxan induction	78.3±9.2 P<0.05	77±95.05 P<0.05	76.3±24.08 P<0.05	71.8±25.1 P<0.05	65.8±1460 P<0.05	68.7±87.25 P<0.05
Insulin	76.7±13.61 P<0.05	327±164.61 P<0.05	255.7±40.46 P<0.05	168±31.32 P<0.05	70.3±802 P<0.05	59.3±6.03 P<0.05
Glibendamide	68.3±46.8 P<0.05	502.7±62.2 P<0.05	280±13.75 P<0.05	194±9.64 P<0.05	71±9.85 P<0.05	66±7.57 P<0.05
Goko cleanser	76.7±13.61 P<0.05	362±224.40 P<0.05	342.7±30.6 P<0.05	1.00±26.0 P<0.05	124±24.9 P<0.05	115±18.23 P<0.05

The study has shown that insulin is still the most potent drug in the treatment of diabetes followed by glibenclamide in the study. The higher potency is explained based on the fact that insulin is specifically meant to act on the glucose as it is produced by the body; the pancreas for that purpose though there is resistance to it[24], [25], [26] and [27]. Glibenclamide is a synthetic drug for the treatment of diabetes, it is known as sulfony urea and glyburide. Studies with this drug has shown it high potency in the treatment of alloxan induced diabetes when compared with a herbal drug [21]. The drug activity is based on its binding and also inhibiting ATP- sensitive potassium channels i.e particularly sulfonylurea the subunit receptor[28]. The inhibition causes cell membrane depolarization and opening of voltage dependent calcium channels. Such leads to increase intracellular calcium in the beta cells of the pancreas resulting in the release of insulin to act on glucose[25]. The glibenclamide does not have its direct potency on the glucose levels except by dependent on insulin. This means that if the pancreas is impaired glibenclamide action is also impaired. The drug also has neuroprotective properties. Also, insulin does not have direct effect on

the glucose level it act via receptors binding to cells like fats and liver cells. The insulin receptor is a heterodimer with alpha and beta subunits and insulin binds on the alpha subunits. Glucose is thus transported across cell membrane by the stimulated action of insulin via glucose transport GLUT4 [29], [30] and [31]. Goko Cleanser in the study showed little anti-diabetic properties on the 28th day of the treatment. The implication here is that it does not give prompt action to the glucose level. The normal fasting blood glucose range level is 60-120mg/dl. It was only on day 28 that such was achieved. Other drugs, insulin and glibenilamide showed prompt action on the glucose levels from day 21. The antidiabetic properties of Goko cleanser may be due to its allium sativum. It contains s-allyl cysteine sulphoride, a sulphur containing amino acid of garlic[32]. However, it was observed that animals treated with Goko cleanser showed weight gain and such was prominent in the stomach region. This may be due to increase appetite induced by the drug resulting in a condition called polyphagia[1]. And in polyphagia there is high glucose level which the body is unable to utilize and the cells are deprived of glucose leading to increase sensation of hunger [3]. Polyphagia is one of the clinical symptoms of diabetes. The polyphagia syndrome found only in the Goko cleanser group treatment has two implications. One is that of the persistence of high glucose unutilized i.e. the continuous presence of diabetes. The second fact is that the drug has the tendency of increasing appetite and high food consumption which will eventually results in obesity and obesity will result in diabetes. There was also polyuria i.e. frequent urination {1} in the Goko cleanser treated group on day 28 which the glucose level was even within the normal range. This means partial effectiveness of the drug despite the value that showed normalcy. Also polyuria is one of the clinical symptoms of diabetes. There was increased excretion of faeces indicating association of diarrhoea with the intake of this drug. But the drug is claimed to contain veronia amygdalina effective against amoebic dysentery {13}. Perhaps the diarrhoea if found in persons using the drug may also be associated with wrong dosages of the drug via self medication. The diarrhoea observed in the study must have resulted from irritation of gastrointestinal system. There are claims that the low dosage of the drug is effective against diabetes but our study was done based on acute toxicity test method. Results of such application should be published with acute toxicity test.

4.CONCLUSION

Goko cleanser is found to have mild antidiabetic properties on long usage. The prescription by the manufacturer is two table spoonful three times a day, such which should be compared to the effect on vital organs like kidneys, the liver and the heart. However, the manufacturer of the drug could review the drug preparations and check if there is possible adulteration by persons.

ACKNOWLEDGEMENT

The authors are grateful to staff of the Department of Pharmacology Laboratory, University of Uyo, Uyo and particularly Mr. Nsikan Malachy.

CONFLICT OF INTEREST

There is no conflict of interest, the work is original and there is no contention between the authors.

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