Comparative Effects Of Differently Prepared Bitter Leaf (Vernonia Amygdalina) Juice On Blood Parameters Of Type Ii Diabetic Patients Above 50 Years Of Age

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Abstract: The study examined the comparative effects of differently prepared bitter leaf (Vernonia Amygdalina) juice on blood parameters of type ii diabetic patients above 50 years of age. 12 adult diabetic patients above 50 years of age whose record were obtained from medical and health center and who gave consent for the study were group into two. One group took juice prepared by wash-squeez-drink while the second group took juice prepared by wash-boil-drink three days a week for four weeks. The blood parameters such as blood glucose, serum cholesterol, HDL, LDL and triglyceride were determined using standard methods. The reduction in each parameter was motired weekly and compared and also monthly. Findings from the study revealed that group two who took the juice prepared by washing, boiling and drinking had the highest significant reduction in blood glucose by the fourth week (138.72 ± 3.02 , P ≤ 0.05) compared to group one. Significant difference was also observed in the reduction levels of blood glucose of group one and two in week three with group one having the highest reduction in blood glucose. Significant reduction level was only observed in both groups only in week three with group one having most significant reduction in serum triglyceride (185.43 ± 9.15 , P ≤ 0.05). Most importantly, analysis of variance across the four weeks revealed that significant differences existed between the triglyceride reduction patterns/ levels in both groups one and two. It was concluded that bitter leaf has some antidiabetic properties which could help in the management of diabetes.

Keywords: Diabetes, Bitter leaf, blood glucose, glucometer, blood pressure

I. INTRODUCTION

The increase in the cases of Diabetes Mellitus (DM) especially type II diabetes all over the world is becoming alarming. Reports from Centres for Disease Control and Prevention (CDC) shows that 90-95 of the over 30 million Diabetic patients in the United States involve type 2 diabetes. According to Oputa and Chinyere (2015), more than 95% of DM cases in Nigeria are type 2 diabetes. Type 2 diabetes is a progressive condition in which the body becomes resistant to

the normal effects of insulin and/or gradually loses the capacity to produce enough insulin in the pancreas. Although, the case of type 2 diabetes is not known, it is known that type 2 diabetes have strong genetic and family risk factor. According to Diabetes Australia (2019), the risk of type diabetes increase when people with strong genetic disposition towards DM display certain modifiable lifestyle factors including obesity, poor diet, overweight and high blood pressure. Such people become predisposed to getting type 2 diabetes if they: have a family history of diabetes, are older,

are over 45 and overweight or have high blood pressure (Diabetes Australia, 2019).

The problem of type 2 diabetes in relation to age has become an issue of interest. This is because obese and sedentary life style hasten the onset of diabetes into earlier life but older obsess and sedentary people are still far more likely to suffer type 2 diabetes than are equally overweight and sedentary younger counterparts. Middle-aged and older adults are still at the highest risk of developing type 2 diabetes (Kristeen, 2018). Statistics from the report of Kristeen show that older adults between the ages of 45 to 64 have 809, 000 new cases as of 2015 and only at that age range is the highest number of new cases of DM recorded. These adults because they are old may barely practice healthy life style through exercise and diet. Thus, they manifest some health conditions associated with type 2 diabetes such as obesity, high blood pressure, low levels of HDL, high levels of triglycerides, indications of insulin resistance and vascular diseases. There is need therefore, for a management therapy that could reduce the cases of type 2 diabetes among the ages through recourse to readily available and cheap plants found in every Nigerian community such as Bitter leaf.

Bitter leaf (*Vernonia Amygdalina*) is a common leaf in African and is used in preparing and cooking various delicacies. However, the health benefits of bitter leaf are not widely known among peoples in whose community bitter leaf grow. Certain cultures in the Nigerian society infer that bitter leaf cures insomnia, tones up the liver and kidney, detoxifies the whole body, aid to protect the body against pollutants when taken as bitter leaf juice. However, the health benefits of the raw juice often drunk by the Nigerian people for aged type 2 diabetic patients especially in relation to certain blood parameters is not widely known.

In the Nigerian communities, bitter leaf is actively used in medicine and the most common product made from the herb is bitter leaf juice. It believed among these communities that drinking bitter leaf water can help women stay younger for a long time, improve appetite, helps lactating mother produce milk, cures cough and for curing parasitic intestinal infections as well as boosting immune system. Although, the people hold these views, most of their claims have not been established empirically through research and especially for aged people with type 2 diabetes.

PURPOSE OF THE STUDY

The study examined the comparative effects of differently prepared bitter leaf *(vernonia amygdalina)* juice on blood parameters of type ii diabetic patients above 50 years of age. Specifically, the study sought to find out the:

- ✓ Comparative effects of bitter leaf juice prepared by washsqueez-drink and wash-boil-drink on blood glucose of diabetic patients.
- ✓ Comparative effects of bitter leaf juice prepared by washsqueez-drink and wash-boil-drink on serum cholesterol, triglyceride, HDL and LDL of diabetic patients.

II. METHODOLOGY

PREPARATION AND PROCESSING OF THE VEGETABLE

Vernonia Amygdalina leaves were plucked from a farm in Onicha-Ugbo village in Delta state and de-stalked, sorted and then washed with clean water. The leaves were processed based on the methods used by diabetic patients who have been using them as a therapeutic management for diabetes. These involved: wash-squeeze-drink and wash-boil-drink. The wassqueeze-drink involved washing the leaves with clean water, washing them with salt to reduce the bitterness and improve the taste of the juice and finally, squeezing the leaves to extract the juice. The wash-boil-drink involved washing the leaves with salt just like in the first preparation, boiling the leaves with 30ml of water for 10 minutes. The water produced from the boiling is allowed to cool to room temperature and drunk.

SUBJECTS

The health care centres in Oshimilli South local government area of Delta state were visited to obtain information from the record unit of food and nutrition (dietic) department. The Federal Medical Centre, Asaba, General Hospital Okwe, Primary Health Care Centre, Asaba were visited for this purpose. Information relating to 20 diabetic patients who were up to 50 years and above was obtained. The patients' day of appointment was taken and they were visited in the hospital on the day of appointment to tell them about the study and to seek their consent for ethical purposes. The addresses of fourteen patients were recorded and agreement was reached on the days to visit each patient to discuss further on the study. Although, some of the patients were already using bitter leaf juice as a management therapy for diabetes, they were told the quantity to drink for the purpose of the study.

ADMINISTRATION OF JUICE

Each subject was allowed to choose the leaf juice extract that would be convenient for them to drink. Nine patients agreed to drink the extract from wash-squeez-drink while the remaining five chose to drink the extract from wash-boildrink. Each patient was given 10mls of the already prepared juice based on their choice every three days before 7pm for one month. Twelve participants complete the study while two dropped after two weeks.

DETERMINATION OF BLOOD PARAMETERS

Venous blood samples collected at the end of every week after taking aseptic precautions. 5 ml of blood was collected in plain vaccum tubes and 2 ml of blood was collected in EDTA vaccum tubes. Blood glucose level of the participants was taken immediately after sample collection using a glucometer. Participants' serum cholesterol, triglycerides, high-density lipoprotein cholesterol (HDL-C) and low-density lipoprotein cholesterol (LDL-C) were estimated using serum and semiautomated Mindray BA-88A chemistry analyser. Samples are taken to the laboratory immediately for determination of serum cholesterol, triglyceride, HDL and LDL.

III. RESULTS

PRESENTATION OF RESULTS

Parameters		Blood	serum	Serum	HDL	LDL
		Glucose	Cholester	Triglyceri	choleste	cholester
		(mg/dl)	ol (mg/dl)	des	rol	ol (mg/dl)
		_	-	(mg/dl)	(mg/dl)	-
Group	Wk	148.12	241.22+	199.33+	36.57+	183.22+
1 (n=7)	1	±1.13	11.29	11.89	3.53	11.21
Mean±	Wk	147+0.	244.91+	188.23+	32.42+	173.12+
SD	2	91	12.17	10.29	6.43	0.12
	Wk	144.12	239.20+	185.43+	36.95+	16.20+5.
	3	±1.03	14.22	9.15	8.53	57
	Wk	145.22	141.28	181.50±	39.24 ±	177.21±
	4	±2.04	19.03	8.98	7.24	8.37
Group	Wk	142.34	251.22 ±	188.32	32.22±	193.32
2 (n=5)	1	<u>+</u> 0.73	9.22	11.18	5.34	3.13
Mean±	Wk	140.23	249.11+	187.83+	33.54+	185.31+
SD	2	±0.99	11.20	11.84	8.42	5.63
	Wk	141.54	249.26 ±	185.56±	34.23 ±	184.23±
	3	± 1.03	15.65	11.82	6.23	7.34
	Wk	138.72	245.23±	179.59±	39.53±	183.22±
	4	±3.02	12.96	13.08	7.54	9.37
MP		0* d*	o*	h*f*		

Data expressed as mean \pm SD, p-value ≤ 0.05 (*) considered statistically significant

WSD = Wash Squeez and drink

WBD = Wash boil and drink

Wk = Week

a*= Group1 week 1 Vs Group 2 week 1

b*= Group1 week 2 Vs Group 2 week 2

c*= Group1 week 3 Vs Group 2 week 3

d*= Group4 week 1 Vs Group 2 week 4

e*= Group1 weeks 1-4 Vs Group 2 weeks 1-4

Table 1: Comparison of Blood Pressure (BP), serum cholesterol, triglyceride, HDL and LDL of group 1 (WSD) and group 2 participants for 4 weeks

IV. ANALYSIS OF RESULT

The results of the study showed that in both group one and two, the highest reduction in blood glucose was on the fourth week. However, group two who took the juice prepared by washing, boiling and drinking had the highest significant reduction in blood glucose by the fourth week (138.72 \pm 3.02, P \leq 0.05) compared to group one. Significant difference was also observed in the reduction levels of blood glucose of group one and two in week three with group one having the highest reduction in blood glucose.

The reduction is serum cholesterol was different from that observed in the blood glucose level. The pattern of reduction in serum cholesterol was not consistent. Although significant difference was observed in the serum cholesterol of group one and two participants in week three with those who took the juice washed, squeezed and drunk having the most significant reduction (239.20 \pm 14.22, P \leq 0.05).

In both groups, serum triglyceride reduced significantly and following a pattern of continual reduction down the weeks. Significant reduction level was only observed in both groups only in week three with group one having most significant reduction in serum triglyceride (185.43 \pm 9.15, P \leq 0.05). Most importantly, analysis of variance across the four weeks revealed that significant differences existed between the triglyceride reduction patterns/ levels in both groups one and two.

In the final observation, no significant difference was observed in the HDL and LDL cholesterol levels of participant in group one and two. Those who took the juice WSD and those who took the juice WBD did not differ in weeks or in the variance of reduction patterns across the weeks. However, there was consistent decline in the LDL cholesterol in both groups across the weeks.

V. DISCUSSION AND RECOMMENDATION

Diabetes as diseases has become a common occurrence in nearly every community in Nigeria. The rate at which the illness in diagnosed among patients gives the indication that more therapies are need to help fight the situation. Studies on the effect of bitter leaf, Vernonia Amygdalina, fractionates and or juice made from the leaf which is constantly drunk in relation to different diseases and other health conditions are inconclusive. The findings from the present study shows that juice from Vernonia Amygdalina could significant reduce blood glucose, serum cholesterol and triglyceride over weeks when prepared differently. Juice prepared by wash-boil-drink significantly reduced blood glucose level compared to juice prepared by wash-squeez-drink. However, juice prepared by wash-squeez drink significantly reduced serum cholesterol and triglyceride more than juice prepared by wash-boil-drink. Most importantly, the variance in the reduction levels of serum triglyceride of both groups across the weeks differed significantly.

The aqueous leaf extract has been shown by Okove, Monanu and Ohanehi (2017) to possess hypolipidemic effects in diabetic and non-diabetic rats. Atangwho, et al. (2007) reported that its protective role on kidney and liver of alloxaninduced diabetic has also been established. The observed significant reduction is some of the blood parameters tested could be attributed to the activity associated with bitter leaf in the alleviation of complications associated with diabetes apart from its anti-diabetic features. The finding of the study lend credence to already existing studies conducted with rats but which shows that aqueous extract from bitter leaf reduced blood parameters associated with diabetes (Adewoga, Sebiomo & Fagbemi, 2014; Akah, Njoku, Nwanguma & Akunyili, 2004; Akawa et al., 2018). The study also supports the findings of Okoli, Okeke, Oli and Ehiemere (2008) that V. Amygdalina elicited significant reduction in blood glucose levels at most postprandial time points.

It is concluded that *V. Amygdaline* possess antidiabetic characteristics that had the potency for the management of type 2 diabetes is adults above 50 years age. It recommended

that more clinical studies be devoted in this area with more particular focus on the adults. Bitter leaf soup and other recipe made from it should be recommended occasionally for diabetic patients. Juice from bitter leaf should be taken at least once a weeks taking note of how the patients respond to the blood parameter and taking precaution as to when they juice intake may constitute and overdose.

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