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EFFECT OF ALOE VERA JUICE ON DIABETIC AND DIABETIC RETINOPATHY SUBJECTS

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ABSTRACT

All people with diabetes mellitus are at risk, those with Type I diabetes and those with Type II diabetes. The longer a person has diabetes, the higher the risk of developing some ocular problem. After 20 years of diabetes, nearly all patients with Type I diabetes and >60% of patients with Type II diabetes have some degree of retinopathy; however, these statistics were published in 2002 using data from four years earlier, limiting the usefulness of the research today. Although data on oral aloe vera for treating elevated blood glucose and normalizing lipid parameters in humans appear favorable, there are numerous and noteworthy limitations in the studies that hinder the clinical application of these results. Present study shows significantly results on lowering Blood sugar, cholesterol and triglyceride levels by consumption aloe vera juice.

KEYWORDS : Aloe Vera, Diabetes, Diabetic rRetinopathy

Aloe vera

Aloe is a succulent plant belonging to the Liliaceal family, of which there are more than 360 species (Figure: 1). Aloe vera is a common name for *Aloe barbadensis*, the most widely used species of aloe (Tanaka et al., 2006). The International Aloe Science Council (IASC) describes three components of the plant that are used: leaf juice (whole leaf as the starting point), inner-leaf juice (from the inner gel fillet), and aloe latex (yellow-brown sap between the inner parenchymous tissues).

Aloe vera juice is prepared from Aloe vera gel, a mucilaginous preparation obtained from the leaves of the plant. The Aloe vera plant has compound such as mannans, polysaccharides, lectins and anthraquinones that are extremely beneficial for human health.

Oral administration of the juice has been reported to reduce fasting blood glucose and triglyceride levels in type 2 diabetic patients with or without combination of a conventional anti-diabetic agent (Kennedy, Wang and Wu 2008). The amount used was one tablespoon of Aloe vera juice twice daily with no significant adverse effects reported.

Diabetes

Diabetes is one of the first diseases described with an Egyptian manuscript from 1500 BC mentioning "too great emptying of the urine."

The worldwide prevalence of diabetes for all age groups was estimated to be 2.8 percent in 2000 and it is projected to be 5.4 percent in 2025.

Figure 1 : ***Aloe barbadensis***

Diabetes mellitus (DM) also known as simply diabetes, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. Untreated, diabetes can cause many complications. Long-term complications from high blood sugar can include heart disease, strokes, diabetic retinopathy where eyesight is affected.

Onset of type 2 diabetes can be delayed or prevented through proper nutrition and regular exercise (Raina and Kenealy, 2008).

It is recommended that all people with type 2 diabetes get regular ophthalmology examination.

Diabetic Retinopathy

Diabetic retinopathy is damage to the retina caused by complications of diabetes, which can eventually lead to blindness. It is an ocular manifestation of diabetes, a systemic disease, which affects up to 80 percent of all

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patients who have had diabetes for 10 years or more. Despite these intimidating statistics, research indicates that at least 90% of these new cases could be reduced if there was proper and vigilant treatment and monitoring of the eyes. The longer a person has diabetes, the higher his or her chances of developing diabetic retinopathy (Kertes and Johnson, 2007). Diabetic retinopathy often has no early warning signs. In the first stage which is called non-proliferative diabetic retinopathy there are no symptoms, it is not visible to the naked eye and patients will have 20/20 vision. On the second stage, as abnormal new blood vessels (neo vascularisation) form at the back of the eye as a part of proliferative diabetic retinopathy, they can burst and bleed (vitreous hemorrhage) and blur vision, because the new blood vessels are weak. Diabetic retinopathy is the result of micro vascular retinal changes (Figure 2).

All people with diabetes mellitus are at risk those with Type I diabetes and those with Type II diabetes. The longer a person has diabetes, the higher the risk of developing some ocular problem. The best way of addressing diabetic retinopathy is to monitor it vigilantly and achieve euglycemia (Fraser-Bell and Hykin , 2008).

Monographs from Health Canada, the German Commission E, and the World Health Organization recognize the use of oral aloe vera as a laxative; however, limited or conflicting evidence exists for other uses, including diabetes mellitus, dyslipidemia, sore throat, hypertension, osteoarthritis, inflammatory bowel disease, fever, itching, asthma, epilepsy, depression, glaucoma, multiple sclerosis, and vision problems (Vogler and Ernst 1999).

METHODOLOGY

The present follow up study was conducted on 100 subjects aged between 25 to 65 years. They were randomly selective irrespective of their caste and creed. Detailed history was taken to exclude any major illness likely to affect blood parameters. The subjects were divided into two groups: 50 Normal control group and 50 Study group.50 Study group was further divided into two sub-groups.

Sub-group A - 25 Diabetic subjects

Sub-group B - 25 Diabetic Retinopathy subjects

The follow up study was conducted in all the aforesaid groups before and after consumption of Aloe vera

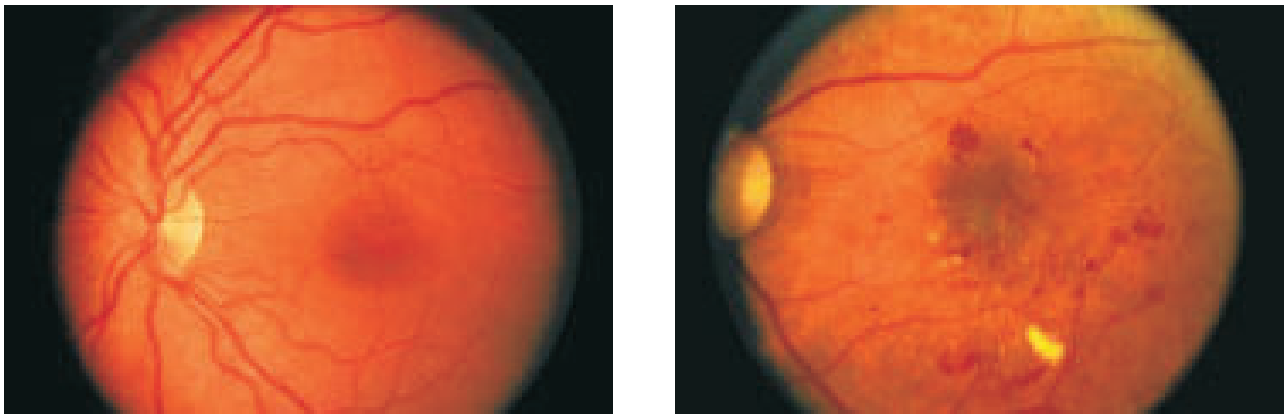

Figure 2 : Normal Retina and Retina showing Diabetic Retinopathy

Table 1 : Blood Parameters (mg%) in Normal Healthy Control and Control Diabetic Subjects.

Parameters	Normal Control	Diabetic Subjects	P-value
	Mean ±SD	Mean ±SD	
Blood Sugar	98.2 ± 7.40	209.5 ± 34.60	<0.001
Total Cholesterol	190.1 ± 18.49	250.9 ± 36.20	<0.001
Triglyceride	123.9 ± 19.66	219.1 ± 38.27	<0.001

Table 2 : Blood Parameters (mg%) in Normal Healthy Subjects Before and After Consumption of 60 ml of Aloe Vera Juice for 15 and 30 Days (Mean ± SD).

Parameters	Before Consumption	15 Days After Consumption	P-value	30 Days After Consumption	P-value
Blood Sugar	92.5 ± 7.00	87.7 ± 7.20	<0.1	86.3 ± 6.00	<0.05
Total Cholesterol	192.8 ± 21.60	171.2 ± 19.95	<0.01	171.4 ± 17.53	<0.001
Triglyceride	113.4 ± 20.04	92.7±19.12	<0.01	87.0 ± 18.92	<0.001

Table 3 : Blood Parameters (mg%) in Diabetic Subjects Before and After Consumption of 60 ml Aloe Vera Juice Per Day for 15 and 30 Days (mean ± SD)

Parameters	Before Consumption	15 Days After Consumption	P-value	30 Days After Consumption	P-value
Blood Sugar	190.1 ± 24.40	160.4 ± 20.74	<0.01	154.3 ± 15.38	<0.001
Total Cholesterol	242.6 ± 33.40	206.5 ± 30.24	<0.01	195.8 ± 26.40	<0.001
Triglyceride	212.0 ± 49.38	173.1 ± 30.79	<0.01	162.7 ± 24.32	<0.001

Table 4 : Blood Parameters (mg%) in Diabetic Retinopathy Subjects Before and After Consumption of 60 ml Aloe Vera Juice Per Day for 15 and 30 Days (mean ± SD)

Parameters	Before Consumption	15 Days After Consumption	P-value	30 Days After Consumption	P-value
Blood Sugar	228.4 ± 23.08	205.8 ± 20.30	<0.01	200.5 ± 19.92	<0.01
Total Cholesterol	257.1 ± 41.06	217.8 ± 35.60	<0.01	208.6 ± 32.24	<0.01
Triglyceride	216.6 ± 40.96	188.5 ± 32.80	<0.01	179±27.95	<0.01

juice 60 ml per day for 30 days and blood samples were taken after interval of 15 days to find out significance of long term use of aloe vera juice.

The samples were analyzed for the following parameters by semi auto analyser using standardized enzymatic kits, are Blood sugar, total cholesterol and Triglyceride (TG). For Statistical analysis Student's t-test was applied to determine the significance of value ($p < 0.05$).

RESULTS

Table 1 shows blood parameters for normal control group and study group, Mean and SD along with p value which show highly significant $p < .001$ in study group subjects.

In normal control group after 30 days of consumption of Aloe vera juice, Blood sugar result shows less significant ($p < .05$), cholesterol and triglyceride result were highly significant ($p < .001$). (Table-2)

Table 3 shows highly significant result in Diabetic study group subjects in all blood parameters. In Diabetic Retinopathy study group results all blood parameters were significant ($p < .01$), after consumption of 60 ml Aloe vera juice for 30 days. (Table- 4)

DISCUSSION

Controlling your blood sugar is the key risk factor that you can affect. Lower blood sugar levels can delay the onset and slow the progression of diabetic retinopathy. Elevated blood lipid levels can lead to greater accumulation of exudates, protein deposits that leak into the retina. This condition is associated with a higher risk of moderate visual

loss. Aloe vera gel has been claimed to have antidiabetic activity but not all published results are consistent. The effect of Aloe vera juice in combination with glibenclamide was investigated in diabetic patients. There was no response to glibenclamide alone but Aloe vera juice significantly reduced levels of fasting blood glucose within two weeks and of triglycerides within four weeks. It showed no effect on cholesterol levels and had no toxic effects on kidney or liver function as assessed by blood chemistry. The results support the use of Aloe vera in the treatment of diabetes. In present study blood sugar level was found to be raised significantly in study group as compared to that of normal control. According to (Harbans Lal, 2000), due to deficiency of insulin resulting reduced entry of glucose in body cells and increased glucose release from liver to circulation. Similarly, serum cholesterol level was increased in diabetic as compared to normal control group due to increased intestinal HMGCoA reductase activity resulting enhance cholesterol synthesis. The statistical significant increase in serum triglyceride may be due to insulin deficiency, which increases free fatty acids and decrease lipoprotein lipase activity in diabetic subjects resulting increased triglyceride level.

The reduction in Blood sugar level after consumption of 60 ml aloe vera juice may be due to aloe vera detoxifying properties. As a nutritional supplement, Aloe vera high fiber content and the presence of polysaccharides and glycoprotein are believed to help the body use glucose effectively and remove excess from the blood.

A significant reduction in serum cholesterol might be Aloe vera juice contains B-sitosterol, which blocks cholesterol absorption in the body.

The serum triglyceride level was found to be reduced significantly due to decrease absorption of triglyceride and fatty acid and increase of fecal excretion of fat and fatty acids by aloe vera juice. Preliminary research suggests that intake of aloe vera juice can help improve blood glucose levels and may therefore be useful in treating people with diabetes (yongchaiyudha et al., 1996). Results of present study support this, Blood sugar level showed significant result.

In a 2007 review article, Ulbricht et al; concluded that the evidence regarding oral aloe vera efficacy in patients with diabetes mellitus was conflicting. Since that publication, additional studies investigating aloe vera for lowering fasting blood glucose and glycosylated hemoglobin (HbA_{1c}) concentrations have been reported. This article reviews the available literature on the efficacy of oral aloe vera in diabetes mellitus and dyslipidemia in humans.

Result of present study shows supports the observation of (Nasiff et al., 1993).that Aloe vera juice shows significant effect on cholesterol and triglyceride in normal as well as diabetic patients. In a study evaluating lipid variables, examined the effect of oral Aloe vera extract on lipid metabolism in patients with hyperlipidemia uncontrolled by dietary interventions .

CONCLUSION

Although data on oral Aloe vera for treating elevated blood glucose and normalizing lipid parameters in humans appear favorable, there are numerous and noteworthy limitations in the studies that hinder the clinical application of these results. With the emergence of new data and a lack of consensus on the glycemic and lipid effects of aloe vera in humans, a thorough study has been required. The effect of aloe vera juice is beneficial in Diabetes by lowering blood glucose level, Diabetic retinopathy is one of the complication of Diabetes. By the dietary control and taking fiber diet and aloe vera juice complication of Diabetes can be prevented. Aloe vera juice prevents oxidative stress, cure wounds, relieves joint and muscle pain, promote hair growth, reduce arthritis pain, cure dermatitis, hypoglycemic, hypolipidemic anti cancer and lot of benefits.

It is recommended that intake of aloe vera juice 30 ml daily will be beneficial both in normal and Diabetic subjects.

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