Original Article

Community and Public Health Nursing
Vol. 5 No. 2, May – August 2020
DOI: http://dx.doi.org/10.21088/cphn.2455.8621.5220.1

To Study The Efficacy of Amla and Okra Juice on Blood Glucose Level Among Type 2 Diabetes in Selected Rural Settings of Puducherry

Gomathi A[1], Kamalam S[2], N Jeevaanand[3]

How to cite this article:
Gomathi A, Kamalam S, N Jeevaanand. To Study The Efficacy of Amla and Okra Juice on Blood Glucose Level Among Type 2 Diabetes in Selected Rural Settings of Puducherry. Community and Public Health Nursing. 2020;5(2):81–85.

Author's Affiliations: [1]Associate Professor, College of Nursing, AIIMS, Jodhpur, [2]Professor cum Principal, AG Padmavathi College of Nursing, [3]Medical Officer (Ayurveda) Primary Health Centre, Ariyur, Puducherry, India.

Corresponding Author: Kamalam S, Professor cum Principal, AG Padmavathi College of Nursing, Puducherry, India.

E-mail: dr.kamalam1952@gmail.com

Abstract

Background: Type 2 diabetes Mellitus (T2DM) common form of DM characterized by hyperglycemia, insulin resistance, and relative insulin deficiency. Interaction between genetic, environmental and behavioral risk factors, more vulnerable to complications, leading to their premature death. Insidious onset and late recognition, leads to increased morbidity and mortality especially in poor resource developing countries. *Methods:* The Randomized pilot clinical trial was conducted to check the effectiveness of Amla juice and okra juice (lady's finger) in controlling blood sugar level among T2DM adults aged between 40–60 yrs in rural areas of Puducherry. The 3 villages were selected by cluster sampling method, subjects were selected from 3 villages by simple random sampling method and they were divided into three groups. Five T2DM subjects were recruited from each village. The data were collected on general information, background information, clinical information, anthropometry along with fasting blood sugar, and glycosylated haemoglobin. The group I of 5 subjects were given a medium sized fresh Amla juice (50 g) on a daily basis in empty stomach for 3 months. The group II of 5 subjects were given a medium sized overnight soaked okra's mucilage (50 g) on a daily basis in empty stomach for 3 months. *Results:* There was a significant difference exist between before and after intervention in group I and II. The Amla and Okra juice was effective in reducing the FBS level. *Conclusion:* The study found that Amla juice and okra's juice therapy confers good glycaemic control in group I and II.

Keywords: BMI; Blood pressure; HbA1C; Fasting blood sugar.

Introduction

Type 2 DM– common form of DM characterized by hyperglycemia, insulin resistance, and relative insulin deficiency. Interaction between genetic, environmental and behavioral risk factors, more vulnerable to complications, leading to their premature death. Insidious onset and late recognition, leads to increased morbidity and mortality especially in poor resource developing countries.[1]

A study has shown the effect of Amla on Various Physiological and Biochemical Parameters of Metabolic Syndrome in which there was significant improvement in glycemic control, systolic and diastolic blood pressure and lipid profile.[2]

The tannoids of Amla are potent inhibitors of Aldose Reductase (AR) and suggest that people can incorporate into everyday life may be an effective approach in the management of diabetic complications. Also involved in regeneration and rejuvenation of beta cells, thus leading to an increase insulin production and secretion. Evidence indicates that the aqueous extract amla has definite hypoglycemic potential as well as anti-diabetic activity.[3x]

Amla fruit has significant effect in decreasing in blood glucose level, total cholesterol and triglycerides in both normal and diabetic clients.[4]

A review on Nutritional Quality and Health Benefits of okra found that the presence of rich content of fiber helps to stabilize blood sugar by increasing rate of sugar absorption in intestinal tract and decreased clinical indications of kidney damage. Okra is high in antioxidants activity, has several potential health beneficial effects on cardiovascular disease, type 2 diabetes, digestive diseases and cancers.[5] Glycosylated compounds from okra is used as a mucilaginous food additive against gastric irritative and inflammatory diseases.[6] Different parts of the okra plant are used extensively as a traditional medicine for anti-diabetic, antipyretic, diuretic, antispasmodic, around the world.[7]

Type 2 DM is a metabolic disease that can be prevented through lifestyle modification, diet control, and control of overweight and obesity. Education of the populace is still key to the control of this emerging epidemic. Novel drugs are being developed, yet no cure is available in sight for the disease, despite new insight into the pathophysiology of the disease. Management should be tailored to improve the quality of life of individuals with T2DM. Hence the present the study is designed to investigate the efficacy of amla juice and okra juice on blood glucose level among type 2 diabetes in selected rural settings of Puducherry.

Materials and Methods

This study was conducted in the three villages of villiyanoor district of Puducherry. The study was initiated after obtaining ethical permission from the institute ethical committee (AGP/IEC/2018/17XNOO5), AGP, Puducherry and informed consent from the study subjects. The randomized pilot clinical trialwas conducted to check the effectiveness of Amla juice and okra juice among T2DM adults aged between 40–60 yrs in rural areas of Puducherry. The 3 villages were selected by cluster sampling method, subjects were selected from 3 villages by simple random sampling method and they were divided into three groups. Five T2DM subjects on standard metformin therapy (500 mg) were recruited from each village. Patients known to be type 2 diabetic for less than five years, with FBS level > 125 mg/dl and HbAIC ≥6.5% were included in this study. Patients with type I diabetes, gestational diabetes mellitus, chronic alcoholism, severe anemia and any other diseases in addition to metabolic syndrome were excluded from the study except with hypertension. The group I of 5 subjects were given a medium sized fresh Amla juice (50 g) on a daily basis in empty stomach for 3 months. The group II of 5 subjects were given a medium sized overnight soaked okra's mucilage (50 g) on a daily basis in empty stomach for 3 months. Group III received only standard metformin therapy.

Preparation of Gooseberry and Lady's Finger Juice

Phyllanthus emblica (Amla) is a member of *Phyllanthaceae* family. Fresh Amla was obtained fromlocal market, 50 g was washed, cut into pieces and seeds were removed. It was grinded and mixed with water and made into 100 ml of juice.

Emblica officinalis (Okra) is a member of *Malvaceae*. Fresh okra was obtained from local market. 50 g was washed and cut into two vertical pieces and soaked in 200 ml water capacity of bottle overnight and extracted the mucilaginous water.

Group I Subjects were asked to take 100 ml of Amla Juice (Emblica officinalis) in the early morning one time only in a day in empty stomach for 90 days. Group II subjects were asked to take 200 ml of okra juice (okra's mucilage) in the early morning one time only in a day in empty stomach for 90 days. Group III subjects were received only standard metformin treatment for 90 days. All three groups received standard metformin therapy. Fasting blood samples were collected for the estimation of fasting blood glucose (FBG) and HbA1c at the beginning of the study and after 90 days of juice supplementation as per protocol. Blood pressure was checked by Sphygmomanometer in sitting position, mean of two readings were recorded, FBS measuredbythe standardized Accu-CheK® advantage glucometerand HbA1C level measured by high performance liquid chromatography (HPLC) method at the beginning of the study and after 90 days of juice supplementation. After every month all the parameters were recorded and noted till three months in all the three groups.

Results

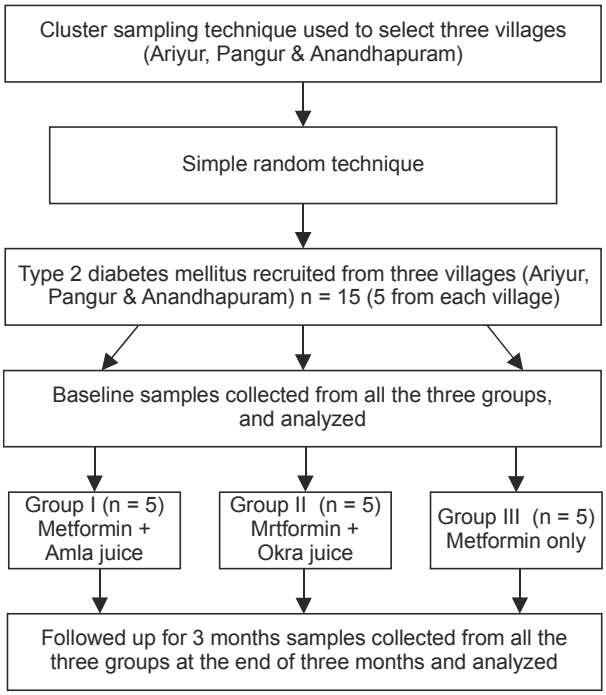

Fig. 1:

Table 1: Frequency And Percentage Distribution Of Between The Groups According To Their Age And Sex N=15.

Age Group (Years)	Group 1		Group II		Group III	
	Female	Male	Female	Male	Female	Male
	N(%)	N(%)	N(%)	N(%)	N(%)	NO %
40–50	2 (40)	–	2 (40)	–	3(60)	1(20)
50–60	3(60)	–	1(20)	2 (40)	1(20)	–
Total	5(100)	–	3(60)	2(40)	4(80)	1(20)

It was interpreted from table 1 that in study group I there is no male subject and in study group II more than half of the subjects were females (60%) and in group III 80% of them were female (Table 1).

It was interpreted from Table 2 that there is no much difference seen in pre and post-test mean BMI and blood pressure. But the mean difference was seen in fasting blood sugar (FBS) in group I and II. In group I blood sugar reduced from pre diabetic stage to non-diabetic stage and in group II it was reduced to diabetic stage to pre diabetic stage. In group III no much difference was seen. So it was interpreted that the Amla and Okra was effect in reducing the blood glucose level.

There was no significant difference in FBS and HbA1c on supplementation of amla juice in group I. FBS was significantly reduced on supplementation of Okra juice in group II. There was significant difference in FBS in group III (Table 3). It was found that there was no significant difference on BMI, SBP and DBP on administration of juices of amla and okra in group I and Group II.

Statistical Analysis

The data were presented as mean ± S.D. The data were analysed using SPSS 16 software. Data variations between the groups were analysed by non-parametric Mann-Whitney test independent 't' test. A P value of <0.05 was considered as statistically significant.

Table 2: Comparison of Different Parameters between the groups.

Parameters	GROUP I (n=5)		GROUP II (n=5)		Group III (n=5)	
	Pre-test (Baseline)	Post test	Pre-test (Baseline)	Post test	Pre-test (Baseline)	Post test
	Mean	Mean	Mean	Mean	Mean	Mean
BMI	29.18±4.21	26.18±4.20	26.97±1.06	26.26±2.43	25.66±5.26	23.9 ±3.26
SBP	144±15.16	138±8.36	138±13.78	136±16.73	122±8.36	118±8.39
DBP	94±5.47	84±8.94	88±8.36	86±11.4	80±7.07	78±9.79
FBS	139.8±19.65	117±7.68	219±70.66	165.4±40.05	133.2±7.39	125±7.81
HbA1c	8.94±1.84	7.24±1.19	12.22±2.36	9.12±1.79	7.02±0.46	6.54±0.76

Table 3: Comparison between Differences of Means of Anthropometric and Biochemical Parameters between the groups.

Parameters	GROUP I (n=5)		GROUP II (n=5)		GROUP III (n=5)	
	Mean ±SD	P value	Mean ±SD	P value	Mean ±SD	P value
BMI	– 3±0.01	NS	–0.71 ±1.37	NS	–1.77±2	NS
SBP	–6±6.8	NS	–2±2.95	NS	–4±0.03	NS
DBP	–10±3.47	NS	–2±3.04	NS	–2±2.72	NS
FBS	–22.8±11.97	0.05	–53.6±30.61	0.021*	–8.2±0.42	0.007*
HbA1c	–1.7±0.65	0.077	–3.1±0.57	0.892	–0.48±0.3	0.046

Discussions

E. officinalis Gaertn., which is commonly called Amla fruit or Indian Gooseberry, has traditionally been used in folk medicine, is very effective in treatment of Acidity and Peptic ulcers. Amla is rich in Vitamin C, Calcium, Iron, essential amino acids, vitamins, minerals and anti-oxidants. It's also improves immunity, fights cancers, rejuvenates the body. Ayurveda describes it as one of the best herbs for Diabetes, bleeding disorders, strength and stamina promoter.[8] It has an important position in Ayurveda an Indian indigenous system of medicine, Ellagic acid in amla is potent α-amylase and αglucosidase inhibitor with significant antiglycation and antioxidant activity.[9]

Abelmoschus esculentus (Okra) is a potential natural compound for prevention and management of Diabetes and reduces hyperglycemia. Okras water soluble extracts and ethanol extracts helps in lowering the blood glucose levels in diabetic patients. Regular inclusion of okra juice in daily diet (3 times in a week) can provide effective protection against diabetes and hyperglycemia.[10]

The results of the present study indicated that the supplementation of okra juice for 90 days has significantly decreased fasting blood glucose in group II diabetic patients as compared with baseline values (day 0). The results are line with previously reported study which reported anti-hyperglycemic effect of okra juice in Type 2 diabetic patients administered for 3 times in a week which is due to the presence of Myricetin, flavonoid.[11] Another study revealed that the same effect of okra on blood glucose in type 2 diabetic patients.[12]

The supplementation of Amla juice in group I did not show significant decrease in blood glucose level for 90 as compared with baseline values (day 0). There was significant decrease ($P<0.05$) in fasting blood glucose on day 90 in group III diabetic patients as compared with baseline values (day 0). Since Metformin is an anti-diabetic drug which also reduces the blood glucose level. The adjuvant effect of amla and okra juices along with metformin was compared to group III. More sample size is needed to observe the better efficacy of amla and okra juice administration in controlling blood glucose levels.

The supplementation of amla juice in group I and the supplementation of okra juice in group II did not show any adverse effect on blood glucose level in the subjects. There were no significant findings in BMI, DBP and SBP among all the three groups. Manoj Gupta et al., found that Amla therapy had good glycaemic control, significantly improved blood pressure also decreased BMI.[13,14]

Emblica officinalis fruits have been found to inhibit enzymes of carbohydrate absorption, including α-glucosidase and α-amylase.[15] EO is proved as an important inhibitor of Aldose reductase (AR), helps to prevent the development of secondary complications of diabetes including cataract. Exploring the therapeutic value of natural ingredients that people can incorporate into everyday life which may be an effective approach in the management of diabetic complications.[16]

Numerous studies have been proved that amla juice has significant decrease in blood glucose level. Even though in this study could not confer the there was a significant decrease in blood glucose level after the administration of amla juice (group I). It may be due to small sample size. Further studies are needed to confirm the efficacy of amla and okra juices on glycemic control and anthropometric measurements.

Conclusion

The present study illustrated the anti-hyperglycemic properties of Amla fruit and Okra which might be used as an adjuvant therapies in the prevention and treatment of diabetes in general population.

Funding: No funding sources

*Conflict of Interest:*The authors report no conflict of interest

Acknowledgement: We would like to thank the study participant, medical officers and staffs working in Primary Health Centre, Ariyur, Puducherry for their help during the data collection and special thanks to Dr. K. V. Raman, former Director of Health and Family welfare, Govt of Puducherry. We also thank Ms.Mohanasundari SK Tutor AIIMS Jodhpur for her valuable suggestions in the analysis of the data.

Ethical Approval: The study was approved by the Institutional Ethics Committee.

References

1. Nicolucci A, Kovacs Burns K, Holt RIG, Comaschi M, Hermanns N,Ishii H, et al. Diabetes Attitudes, Wishes and Needs second study (DAWN2TM): Cross-national benchmarking of diabetes-related psychosocial outcomes for people with diabetes. Diabet Med J Br Diabet Assoc 2013; 30(7):767–77.

2. Manoj Gupta et al., Effect of Amla (Emblica officinalis) on Various Physiological and Biochemical Parameters of Metabolic Syndrome Sch. J. App. Med. Sci.,2016; 4(2):469–75.
3. Walia. K., Boolchandani. R. Role of Amla in Type 2 Diabetes Mellitus - A Review, Res. J. Recent. Sci. 2015:4:31–35.
4. Akhtar MS, Ramzan. A, Ali A, Ahmad M, Effect of Amla fruit (Emblica officinalis Gaertn.) on blood glucose and lipid profile of normal subjects and type 2 diabetic patients, International Journal of Food Sciences and Nutrition.2011;62;(6) Early Online:1–8.
5. Adiaha MS, Effect of Okra (Abelmoschus esculentus L. Moench) on Human Development and its Impact on the Economy of Farmers in Obubra Rainforest Zone of Nigeria, WNOFNS .2017:10:80–85.
6. Akhtar SN, Dhillon P, Prevalence of diagnosed diabetes and associated risk factors: Evidence from the large-scale surveys in India, Journal of Social Health and Diabetes,.2017;5:1. [Downloaded free from http://www.joshd.net.
7. Roy A, Shrivastava SL, Mandal SM, Functional properties of Okra Abelmoschus esculentus L. (Moench): traditional claims and scientific evidences; Plant Science Today. 2014;1:(3):121–30.
8. Sampath Kumar KP, Bhowmik D, Dutta A, Yadav P.D.A, Paswan S, Srivastava S et al.Recent Trends in Potential Traditional Indian Herbs Emblica officinalis and Its Medicinal Importance, J of Pharmacognosy and Phytochemistry. 2012; 1(1):124–31.
9. Dasaroju.s, Gottumukkala K.M,Current Trends in the Research of Emblica officinalis (Amla): A Pharmacological Perspective,Int. J. Pharm. Sci. Rev. Res. 2014;24:2(25):150–59.
10. Prabhune. A, Sharma. M and Ojha. B,belmoschus esculentus (Okra) potential natural compound for prevention and management of Diabetes and diabetic induced hyperglycemia: Review,International Journal of Herbal Medicine. 2017; 5(2):65–68.
11. Prabhune A, Sharma M, Ojha B, Abelmoschus esculentus (Okra) potential natural compound for prevention and management of Diabetes and diabetic induced hyperglycemia: Review,IJHM. 2017; 5(2): 65–68.
12. Davis. S, D'Souza J, Effectiveness of Lady's Finger Juice in the Control of Blood Sugar Among Type 2 Diabetes Mellitus Clients Aged 45–60 Years in Selected areas of Mangalore.IJSR. 2014; 3(4):374–5.
13. Manoj Gupta et al., effect of Amla (Emblica officinalis) on Various Physiological and Biochemical Parameters of Metabolic Syndrome Sch. J. App. Med. Sci. 2016; 4(2C):469–475.
14. Judprasong K, Charoenkiatkul S, Thiyajai P, Sukprasansap M.; nutrients and bioactive compounds of Thai indigenous fruits. Food Chem. 2013; 140 :(3):507–12.
15. Nampoothiri SV, Prathapan A, Cherian OL, Raghu KG, Venugopalan VV, Sundaresan A.; In vitro antioxidant and inhibitory potential of Terminalia bellerica and Emblica officinalis fruits against LDL oxidation and key enzymes linked to type 2 diabetes. Food Chem Toxicol. 2011;4:(1):125–31.
16. Suryanarayana P, Kumar PA, Saraswat M, Petrash JM, Reddy GB; Inhibition of aldose reductase by tannoid principles of Emblica officinalis: implications for the prevention of sugar cataract. Mol Vis. 2004; 10(20):148–54.