

Fruit that supply essential nutrients to human body

Authors:

Mastoi Shah Murad, Nusratullah Khan, Shumaila Najeeb, Hafiz Moeen-Ud-Din, Seema Shah Murad, Farid-Ud-Din, Seema Shah Murad

Professor of Pharmacology, IMDC, Islamabad, Pakistan.

Assistant Prof of Biochemistry at Bolan University of Medical and health Sciences, Quetta, Pakistan

Asso Prof of Histopathology at Yusra Medical College, Islamabad Pakistan

Associate Prof of Anatomy at AIMC Lahore Pakistan

Gynecologist at NMC Karachi Pakistan

Lecturer Pharmacology at DANTH Islamabad Pakistan

Gynecologist at NMC Karachi Pakistan

Corresponding Author:

S Murad, HOD Pharmacology at IMDC Islamabad Pakistan.

Article Received: 17-March-2020, Revised: 07-April-2020, Accepted: 27-April-2020

ABSTRACT:

Coronary artery disease (CAD) is a major determinant of the long-term prognosis among patients with diabetes mellitus (DM). DM is associated with a 2 to 4-fold increased mortality risk from heart disease. Near-normal glycemic control for a median of 3.5 to 5 years does not reduce cardiovascular events. Diabetes mellitus is a chronic, lifelong condition that affects your body's ability to use the energy found in food. There are three major types of diabetes: type 1 diabetes, type 2 diabetes, and gestational diabetes. Diabetes mellitus is a chronic disease caused by inherited and/or acquired deficiency in production of insulin by the pancreas, or by the ineffectiveness of the insulin produced. Such a deficiency results in increased concentrations of glucose in the blood, which in turn damage many of the body's systems, in particular the blood vessels and nerves. Too much sugar in your blood can lead to serious health problems. Type-2 diabetes mellitus, which accounts for 90–95% of those with diabetes, previously referred to as non-insulin-dependent diabetes, or adult-onset diabetes, encompasses individuals who have insulin resistance and usually have relative, rather than absolute, insulin deficiency. At least initially, and often throughout their lifetime, these individuals do not need insulin treatment to survive. Metformin is oral antidiabetic drug having lesser morbid effects as compared to other oral antidiabetic agents. We have compared hypoglycemic potential of herbal hypoglycemic agent Figs or INJEER with Metformin. It was single blind correlational research conducted at Jinnah Hospital Lahore-Pakistan from April to August 2018. Fifty diabetic type-II patients of were selected for research. Approved and explained consent was taken by all patients. They were divided in two groups, 25 patients in each group. Group-I patients were advised to take 250 mg Metformin thrice daily for two months. Group-II patients were advised to take 10 grams of Injeer (Figs) in three divided doses for two months. Their base line fasting blood glucose level was taken and kept in record. They were advised to visit the OPD of the hospital fortnightly. They were also advised to check their fasting plasma glucose level daily at the morning by using Glucometer (provided by Acon Pharmaceuticals Ltd). After two months when results were compiled and statistically analyzed, it was observed that Metformin decreased blood sugar level 27.6 % and Figs decreased 13.5 %. It was concluded from the study that Figs can decrease blood glucose level significantly, but when compared to Metformin, this change is about half fraction of the Metformin. Key words: High serum glucose, lipids, mortality CAD, CCF, hyperlipidemia.

Key Words: Morbidity, mortality, CCF, CAD, cardiac arrhythmias, fats, LDL-Cholesterol, Diabetes mellitus

INTRODUCTION:

A triglyceride is a type of fat you get mostly from the food you eat. Your body also produces it when it converts excess calories to fat for storage. Some triglycerides are necessary for certain cell functions, but too much is unhealthy. As with LDL, lower levels of triglycerides are considered healthier. The most common form of diabetes is called type 2, or non-insulin

dependent diabetes. This is also called “adult onset” diabetes, since it typically develops after age 35. However, a growing number of younger people are now developing type 2 diabetes. People with type 2 are able to produce some of their own insulin. Often, it’s not enough. And sometimes, the insulin will try to serve as the “key” to open the body’s cells, to allow the glucose to enter. But the key won’t work. The cells won’t open.

This is called insulin resistance. Often, type 2 is tied to people who are overweight, with a sedentary lifestyle. Patients with high blood sugar will typically experience polyuria (frequent urination), they will become increasingly thirsty (polydipsia) and hungry (polyphagia). Normally, body breaks down the sugars and carbohydrates eat into a special sugar called glucose. Glucose fuels the cells in body. But the cells need insulin, a hormone, in bloodstream in order to take in the glucose and use it for energy. With diabetes mellitus, either body doesn't make enough insulin, it can't use the insulin it does produce, or a combination of both². Since the cells can't take in the glucose, it builds up in blood. High levels of blood glucose can damage the tiny blood vessels in kidneys, heart, eyes, or nervous system. That's why diabetes -- especially if left untreated -- can eventually cause heart disease, stroke, kidney disease, blindness, and nerve damage to nerves in the feet³. Currently, six classes of oral antidiabetic drugs (OADs) are available: biguanides (e.g., metformin), sulfonylureas (e.g., glimepiride), meglitinides (e.g., repaglinide), thiazolidinediones (e.g., pioglitazone), dipeptidyl peptidase IV inhibitors (e.g., sitagliptin), and α -glucosidase inhibitors (e.g., acarbose)⁴. Metformin marketed under the trade name Glucophage among others, is the first-line medication for the treatment of type 2 diabetes. This is particularly true in people who are overweight. It is also used in the treatment of polycystic ovary syndrome. Limited evidence suggests metformin may prevent the cardiovascular disease and cancer complications of diabetes. It is not associated with weight gain. It is taken by mouth⁵. Metformin is generally well tolerated. Common side effects include diarrhea, nausea, and abdominal pain. It has a low risk of developing low blood sugar. High blood lactic acid levels is a concern if prescribed inappropriately and in overdose. It should not be used in those with liver disease or kidney problems. While there is no clear harm if used during pregnancy insulin is generally preferred for gestational diabetes. Metformin is in the biguanide class. It works by decreasing glucose production by the liver and increasing glucose use by body tissues⁶⁻⁹. Fig is a tree. The fruit is commonly eaten. The fruit and leaves are used to make medicine¹⁰. Raw figs are a good source (14% of the Daily Value, DV) of dietary fiber per 100 gram serving (74 calories), but otherwise do not supply essential nutrients in significant content. In a 100 gram serving providing 229 calories, dried figs are a rich source (> 20% DV) of dietary fiber and the essential mineral, manganese (26% DV), while several other dietary minerals are in moderate-to-low content¹¹. Figs contain diverse phytochemicals, including polyphenols such as gallic acid, chlorogenic acid, syringic acid, (+)-catechin, (-)-epicatechin and rutin¹². Trans-fatty acids,

are worse than saturated fats because they can raise your LDL levels and lower your HDL levels. Some trans fats are found naturally in animal products. Others are found in processed foods that have undergone a process called hydrogenation, such as some kinds of margarine and potato chips¹³.

PATIENTS & METHOD:

Design of research work was correlational, and was conducted at Jinnah Hospital, Lahore from April to August 2018. Fifty diabetic patients (Diabetes Mellitus type-II) were selected from Jinnah hospital to conduct research study. Inclusion criteria was age limit from 25 to 70 years of both gender, male and female whose hyperglycemia was controlled and moderate in state. We excluded those diabetic patients whose hyperglycemia was uncontrolled, unstable, fragile due to use of allopathic or herbal hypoglycemic agents. Patients were divided in two groups. Group-I (25 diabetic patients) was advised to take 250 mg of Tablet Glucophage 250 mg (Metformin) half an hour before taking meal, thrice daily for two months. Group-II patients (25 diabetic patients) were advised to take Injeer (Figs) 10 grams daily in three divided doses half an hour after each meal for two months. Their baseline fasting glucose level was determined by Glucometer (On Call Extra made by ACON Lab 1190059) at start of research work. They were advised to check and keep in record their fasting blood glucose level every day early in the morning. They were advised to take their normal meal without any supplement or high glucose-contained baked or high glucose containing natural fruits. They were advised to come at hospital for follow up or any query regarding drug compliance. Data were expressed as the mean \pm SD and "t" test was applied to determine statistical significance as the difference. A probability value of <0.01 was considered as significant and P<0.001 was considered as highly significant.

RESULTS:

Results of treatment with two different drugs on fasting blood glucose of DM-II patients are shown in following table. Two patients withdrew from group-I due to their personal problems so biostatistical data was applied for 23 patients in this group. In group-I which was on metformin 27.6% glucose reduction was observed which is statistically highly significant change in the parameter in estimated time.

In group-II which was on Figs treatment 13.5% glucose reduction was observed which is statistically significant change in the parameter in estimated time.

Table 1 explaining before and after treatment values, percentage change and statistical significance of diabetic patients with two different drugs

Drug group	At day-0	At day-60	change	% change	p-value
Group-I (Metformin) n=23	230.04±1.99	166.66±2.05	63.4	27.6	<0.001
Group-II (Figs) n=25	219.22±1.67	189.67±1.04	29.5	13.5	<0.01

KEY: All values were measured in mg/dl, Dose of Metformin was 250 mg thrice daily, dose of Figs was 10 grams in three divided doses, n= sample size, p-value <0.01 was considered as significant and p-value <0.001 was considered as highly significant change.

DISCUSSION:

Chronic diabetes conditions include type 1 diabetes and type 2 diabetes. Potentially reversible diabetes conditions include prediabetes — when your blood sugar levels are higher than normal, but not high enough to be classified as diabetes — and gestational diabetes, which occurs during pregnancy but may resolve after the baby is delivered. Allopathic medications are just for good survival of the patients victimized. These drugs have adverse effects which can lead to less compliance of patients. Now a days herbal medications are going to replace allopathic drugs due to their ethnic related doctrine and having lesser adverse effects. In our research Metformin decreased fasting blood glucose 63.4 mg/dl in two months therapy which is equal to 27.6 % decrease. Biostatistically this change in mean values are highly significant which match with results of study conducted by Hubbard JK et al¹⁴ who proved almost same effects of Metformin on fasting blood sugar levels in 103 diabetic patients suffering from Diabetes Mellitus type-II. Dunn CJ et al¹⁵ described that Metformin interrupt carbohydrates absorption from gastrointestinal tract. Our results are in contrast with results of study conducted by Spiller HA et al¹⁶ who observed and proved only 24.8 mg/dl reduction in 22 diabetic male patients when Metformin was used at dose of 250 mg twice daily for three weeks. This contrast in results may be due to less concentration of drug used. Hundal RS et al¹⁷ agrees with already accepted theory of Metformin's hypoglycemic mechanism that inhibition of hepatic gluconeogenesis is main cause for blood glucose level reduction. Triggler CR et al¹⁸ labelled Metformin drug as first choice hypoglycemic agent in type-II diabetic patients. In our research results Figs or Injeer decreased fasting blood sugar about 29.5 mg/dl in two months therapy in 25 diabetic patients of Type-II which is statistically significant decrease in the parameter. These results match with results of study conducted by Mawa S et al¹⁹ who proved that about 30.87 mg/dl of blood glucose may be decreased when Figs are used for three months with regular intake of this fruit with each meal

i.e. thrice daily. C Perez et al²⁰ proved almost same changes in fasting blood glucose in 117 diabetic patients suffering from Type-II DM. Perez C et al²¹ wrote that these fruits can lower fasting sugar level even more than this reduction proved, if used in enough amount and in research controlled environment. Our results do not match with results of research work conducted by Serracarla A et al²² who proved very small amount of blood glucose reduction in 12 patients suffering from DM type-II, even they used 500 mg of Metformin thrice daily for one month. Contrast in these results are or may be due to lesser exposure of drug and small sample size. Lyme WE et al²³ warned in their research work's conclusion that Metformin can cause morbid effects if given concurrently with Insulin. He has encouraged to use Metformin with Figs without any fear of morbid hypoglycemia.

CONCLUSION:

We concluded from this research that hypoglycemic agents of herb origin i.e. Figs may be good antidiabetic agent but these agents have half fraction of hypoglycemic effects when compared with allopathic drug Metformin.

ACKNOWLEDGEMENT: We acknowledge management of the hospital for supporting this research work.

CONFLICT OF INTEREST: No conflict of interest regarding this work

FUNDING: No any financial support was availed regarding this study

REFERENCES:

1.The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus: Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Diabetes Care 2010;20: 1183–1197.

2. Carpenter MW, Coustan DR: Criteria for screening tests for gestational diabetes. *Am J Obstet Gynecol* 2011;144: 768–73.
3. Dell'Aglio DM, Perino LJ, Kazzi Z, Abramson J, Schwartz MD, Morgan BW. Acute metformin overdose: examining serum pH, lactate level, and metformin concentrations in survivors versus nonsurvivors: a systematic review of the literature. *Ann Emerg Med.* 2009;54(6):818–23.
4. Perez C, Canal JR, Campillo JE, et al. Hypotriglyceridaemic activity of *Ficus carica* leaves in experimental hypertriglyceridaemic rats. *Phytother Res* 2008;13(3):188-91.
5. N. A. Zeggwagh, A. Moufid, A. Khaldi, J. B. Michel, and M. Eddouks. Cardiovascular effects of *Nigella sativa* aqueous extract. *Circulation* 2010; 6 (8):343-6.
6. Kostapanos MS, Liamis GL, Milionis HJ, Elisaf MS. Do statins beneficially or adversely affect glucose homeostasis? *Curr Vasc Pharmacol.* 2010;8:612-631.
7. Canal JR, Torres MD, Romero A, Perez C. A chloroform extract obtained from a decoction of *Ficus carica* leaves improves the cholesterolaemic status of rats with streptozotocin- induced diabetes. *Acta Physiol Hung* 2010;87(1):71-6.
8. de Amorin A, Borba HR, Carauta JP, et al. Anthelmintic activity of the latex of *Ficus* species. *J Ethnopharmacol* 2009;64(3):255-8.
9. Fantus IG, Brosseau R. Mechanism of action of metformin: insulin receptor and postreceptor effects in vitro and in vivo. *J Clin Endocrinol Metab.* 2009;63(4):898-905.
10. Lacher M, Hermanns-Clausen M, Haeffner K, Brandis M, Pohl M. Severe metformin intoxication with lactic acidosis in an adolescent. *Eur J Pediatr.* 2005;164(6):362–5.
11. Lipska KJ, Bailey CJ, Inzucchi SE. "Use of metformin in the setting of mild-to-moderate renal insufficiency" *Diabetes Care* 2011;34(6):1431–7.
12. Liu A, Coleman SP (2009). "Determination of metformin in human plasma using hydrophilic interaction liquid chromatography-tandem mass spectrometry". *J. Chrom.* 2009; B-877(29): 3695–3700.
13. Rubnov S, Kashman Y, Rabinowitz R, et al. Suppressors of cancer cell proliferation from fig (*Ficus carica*) resin: isolation and structure elucidation. *J Nat Prod* 2010;64(7):993-6.
14. Hubbard JK, Soman JT, Firka LU. Type 2 diabetes and metformin. First choice for monotherapy: weak evidence of efficacy but well-known and acceptable adverse effects.". *Prescrire international* 2014;23(154): 269–72.
15. Dunn CJ, Mokar TY, Peters DH. "Metformin. A review of its pharmacological properties and therapeutic use in non-insulin-dependent diabetes mellitus". *Drugs* 2007;49 (5): 721–49.
16. Spiller HA, Weber JA, Winter ML, Klein-Schwartz W, Hofman M, Gorman SE, Stork CM, Krenzlok EP. Multicenter case series of pediatric metformin ingestion. *Ann Pharmacother.* December 2010;34(12):1385–8.
17. Hundal RS, Mekun HY, Inzucchi SE. "Metformin: new understandings, new uses". *Drugs* 2008;63(18):1879–94.
18. Triggie CR, Peten TR, Tungju MR, Ding, H. "Metformin is not just an antihyperglycaemic drug but also has protective effects on the vascular endothelium.". *Acta physiologica* 2015;115(4):227-9.
19. Mawa S, Husain K, Jantan I. Phytochemistry of Fig: Traditional Uses and Biological Activities. *Evid Based Complement Alternat Med.* 2013;14(7):4256-9.
20. C Perez, E Domingues, MD Torres. Hypoglycemic activity of an aqueous extract from Fig tree leaves in diabetic patients. *Pharmaceutical Biology* 2009;38(3):181-6.
21. Perez C, Mahul K, Insur T, Dunminku Y et.al; A study on the glycaemic balance in diabetic

patients treated with an aqueous extract of *Ficus carica* (fig tree) leaves. *Phytotherapy Research* 2009;20 (1): 82-83.

Diabetes Research and Clinical Practice 2008;39(1):1200-1211.

22. Serraclara A, Hawkins F, Perez C, et al. Hypoglycemic action of an oral fig-leaf decoction in type-I diabetic patients. *Diabetes Res Clin Pract* 2009;39(1):19-22.

23. Iyeme WE, Sen YS, Paralu YT. Hypoglycemic action of an oral fig-leaf in type-II diabetic patients.